

100th Congress
1st Session

COMMITTEE PRINT

ERADICATION OF GUINEA WORM DISEASE

SELECT COMMITTEE ON HUNGER
U.S. HOUSE OF REPRESENTATIVES



APRIL 1987

Printed for the use of the Select Committee on Hunger

U.S. GOVERNMENT PRINTING OFFICE

70-892

WASHINGTON : 1987

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

H 962-6

SELECT COMMITTEE ON HUNGER

MICKEY LELAND, Texas, *Chairman*

TONY P. HALL, Ohio
BOB TRAXLER, Michigan
LEON E. PANETTA, California
VIC FAZIO, California
SAM GEJDENSON, Connecticut
PETER H. KOSTMAYER, Pennsylvania
BYRON L. DORGAN, North Dakota
BOB CARR, Michigan
TIMOTHY J. PENNY, Minnesota
GARY L. ACKERMAN, New York
MIKE ESPY, Mississippi
FLOYD H. FLAKE, New York
JAMES H. BILBRAY, Nevada
KWEISI MFUME, Maryland
ELIZABETH J. PATTERSON, South Carolina

MARGE ROUKEMA, New Jersey
BILL EMERSON, Missouri
SID MORRISON, Washington
BENJAMIN A. GILMAN, New York
ROBERT F. (BOB) SMITH, Oregon
DOUG BEREUTER, Nebraska
FREDERICK S. UPTON, Michigan

LETTER OF TRANSMITTAL

U.S. HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON HUNGER,
Washington, DC, April 1987.

To Members of the Select Committee on Hunger:

I am pleased to transmit the enclosed Committee Report, "Eradication of Guinea Worm Disease."

The economic and health status of hundreds of millions of people in developing countries is linked to an expansion in the quantity and an improvement in the quality of water supply and sanitation facilities. Therefore, a discussion on the magnitude of the Guinea worm disease problem in Africa and Asia follows, with recommendations for action to eradicate this water-borne scourge, also known as dracunculiasis. By joining in international efforts, the United States can play a vital role in universal eradication, similar to actions that were implemented in attacking smallpox.

Sincerely,

MICKEY LELAND,
Chairman.

FOREWORD

Unsafe water and insufficient water supplies and sanitation facilities are responsible for 80 percent of all human illness and disease, as well as for heavy losses in the agricultural and other economic sectors. The lack of a reliable and safe water supply is a major impediment to the improvement of the health and nutritional status of literally millions of malnourished residents of developing countries; it vastly reduces productivity in a wide range of sectors; and, it diverts millions of hours of potentially productive labor into the search for the daily requirement of water.

Support for water and sanitation projects as a component of the U.S. Government's foreign aid program has been uneven. The Agency for International Development [AID] does not have a water and sanitation functional account, but provides limited support for water and sanitation projects through the health and agriculture/rural development accounts. Additionally, the Economic Support Fund [ESF] is used to support a number of urban water and sewer projects. Funding for water and sanitation programs has declined as a proportion of expenditures in the AID health account (the most important development assistance functional account source of funding for water projects) and of the overall foreign assistance budget. There is no line item in AID's legislation or budget which serves specifically to identify funds to support activities in the water sector. The water and sanitation sector must compete for funding from a variety of accounts and is managed in numerous ways within AID without clear responsibility and authority being established.

The Select Committee on Hunger believes that the economic and health status of several hundred million residents of developing countries is inextricably linked to an expansion in the quantity and an improvement in the quality of water supply and sanitation facilities. It is clear that a major expansion of water for human consumption and sanitation programs within the foreign assistance program is essential for achieving health and economic goals.

A particularly deplorable water-borne disease that illustrates the adverse effects of inadequate and unsafe water supply on health, agriculture, education and the general quality of life in affected areas of Africa and southern Asia is dracunculiasis, also known as Guinea worm disease. Annual cases number about 10 million and in the affected countries, 140 million people are estimated to be at risk to dracunculiasis. Large portions of the rural populations of some countries in Africa are completely incapacitated during planting and harvesting seasons by this illness. The disease has substantial impacts among adult farmers and children and results in de-

creased agricultural output, decreased school attendance, and pain and chronic disability.

The disease is preventable. Health education and treatment of contaminated water are important steps in controlling the disease. Providing safe drinking water in communities where the disease is endemic is considered to be the most effective long-term solution for eliminating the disease completely. The provision of safe water supplies has additional advantages of reducing other water-related diseases, as well as contributing to increased economic output.

The World Health Organization [WHO] recently adopted the universal eradication of Guinea worm disease as a goal, its first eradication goal since the successful attack on smallpox. WHO is calling upon donor governments and organizations, as well as private voluntary organizations, to assist developing country governments to establish plans of action for elimination of the disease. And eradication of Guinea worm disease has become a priority for activities undertaken in the United Nations International Drinking Water Supply and Sanitation Decade.

The report which follows discusses the magnitude of the Guinea worm disease problem in Africa and Asia, the actions which need to be undertaken to eradicate this terrible scourge, and suggests an expanded role as being appropriate for the U.S. Government.

CONTENTS

	Page
Letter of transmittal	iii
Foreword	v
Eradication of Guinea worm disease	1
Conclusions and recommendations	3
Disease cycle	4
Magnitude of the problem	5
Strategies to eliminate Guinea worm disease	9
Current national and international efforts to eradicate Guinea worm disease...	13
Conclusions	14
Table 1.—Summary of current knowledge concerning Guinea worm disease in selected endemic countries	16
Table 2.—National efforts to control Guinea worm disease	17

ERADICATION OF GUINEA WORM DISEASE

INTRODUCTION

Guinea worm disease, also known dracunculiasis, is a disabling parasitic disease prevalent among populations in rural areas of parts of Africa, the Middle East, and Asia. It is the only communicable disease that is transmitted only by contaminated drinking water. A serious impediment to development, Guinea worm disease has severe impacts on health, agricultural production, and school attendance, but until recently has been neglected by many countries and international donors.¹

Because the majority of people who become infected with Guinea worm disease reside in remote rural areas of developing countries, where there are few medical facilities, clinics and health workers, only 1 to 5 percent of the cases are reported. Consequently, the precise number of cases occurring annually is not known. However, it is reliably estimated that the population currently at risk is over 140 million.

Guinea worm disease rarely kills. But its acute and chronic debilitating effects are far-reaching. During the peak "Guinea worm season," which varies among countries in which the disease is endemic, prevalence rates in some communities in West Africa exceed 50 percent. In one village in Mali, more than 80 percent of the agricultural population was infected during one year. Victims of Guinea worm disease are likely to be completely disabled physically for periods of 1 to 3 months; periods of partial disability precede and follow the period of total disability. The disease confers no natural immunity. Consequently, an individual who is infected one year is not protected from infection in subsequent years. Furthermore, multiple infections are possible and result in prolonged suffering and disability. Secondary infections such as septicemia (blood poisoning) gangrene, arthritis and abscesses are common and occur in about half of all cases.

The economic impacts of Guinea worm disease are extensive. Because adults of working age, between 16-45 years of age, are the most heavily affected group, and because the peak occurrence of the disease coincides with periods during which critical agricultural tasks must be performed, agricultural production is disrupted and reduced. Only gross estimates of the value of lost output are available, but they range from \$300 million to more than \$1 billion per year.²

¹ Hopkins, D.H., "Guinea worm disease—a Chance of Eradication?", *World Health Forum*, Vol. 3, No. 4, 1982, pp. 434-435.

² National Research Council, *Workshop on Opportunities for Control of Dracunculiasis*, National Academy Press, Washington, D.C., 1985.

Known methods of treating Guinea worm disease have limited effectiveness in alleviating suffering and disability. Once infected, the disease largely must run its course over a period of a year. But the technology exists to completely eradicate the disease and prevent infections. Furthermore, it is a technology which has proven to be effective in the developing world. Iran, Saudi Arabia, and Yemen have succeeded in either completely eradicating Guinea worm disease or limiting it to a few areas.

One of the most dramatic success stories, as well as the best data on the incidence and prevalence of Guinea worm disease, come from India where at one time the disease was rampant. In 1980, the Government of India initiated a Guinea worm eradication program consisting of active search and surveillance, health education, treatment of unsafe drinking water, and provision of safe water supplies. A 1983 survey found 44,926 cases of dracunculiasis in 11,322 villages throughout the country. The at-risk population was estimated to be 12.2 million. As a result of the program, Guinea worm disease has been completely eliminated from one state, and significant reductions in prevalence are reported for the remaining six states in which it is endemic. The total number of affected villages was reduced to 7,600 in 1985 and the number of cases decreased to 30,134.

Substantial efforts have already been made in some countries to eradicate Guinea worm disease. In other countries the extent of the problem is still being discovered. The Indian Guinea Worm Eradication Programme initiated in 1980 and the extensive rural water supply development program adopted in the Ivory Coast are two exemplary programs mounted by national governments. Alternatively, in countries such as Sudan and Pakistan, activities have only recently been initiated to document existence of the disease.

Because Guinea worm disease is the only communicable disease that is transmitted only by contaminated drinking water, it is the only disease that can be prevented entirely by protecting supplies of drinking water. Alternative strategies available for controlling, eliminating, or eradicating the disease vary in their effectiveness and their costs. Although the most costly, the provision and use of safe drinking water is considered to be the most effective alternative for completely eliminating the disease and avoiding lost output and associated impediments to development. Its cost-effectiveness is enhanced by the other health and economic benefits which result from increasing the availability of safe drinking water.

The U.N. International Drinking Water Supply and Sanitation Decade (1981-90) has the goal of providing safe drinking water to all by 1990. Of the villages without safe drinking water, only 5 to 10 percent have dracunculiasis. Therefore, targeting safe drinking water efforts to these villages would not only provide other health, education, and economic benefits, but also would rid the world of Guinea worm disease. The International Drinking Water Supply and Sanitation Decade presents a special opportunity to bring together host and donor countries for a concerted attack to interrupt transmission of dracunculiasis and thus eradicate it.

CONCLUSIONS AND RECOMMENDATIONS

Guinea worm disease, the only communicable disease that is transmitted only by contaminated drinking water, seriously impedes development by its negative impacts on agricultural production, health, and school attendance. Presently, the disease exists in India, Pakistan, 19 countries in Africa, and possibly in small areas of Yemen. Considerable progress has been made in some countries in recent years to eradicate the disease. In other countries, a combination of scarce technical and financial resources, ineffective and uncoordinated strategies, and a lack of knowledge of the magnitude of the problem have constrained the development and implementation of programs of action.

There is no question that Guinea worm disease can be eradicated. Health education combined with development of safe water supplies, chemical treatment of water, and/or use of special filters can eliminate the disease and provide other development benefits in the form of increased agricultural production, decreased diarrhea and other water-related health problems, and improved educational outcomes.

AID provides support for a number of projects in endemic areas which are specifically directed toward eradicating Guinea worm disease as well as for activities which indirectly contribute to its elimination. Other water and sanitation activities funded by AID in endemic countries are not located in endemic regions of those countries. Of the villages without safe drinking water in the developing world, it is estimated that only 5 to 10 percent have Guinea worm disease. Therefore, targeting resources and efforts toward these villages could rid the world of Guinea worm disease.

The Select Committee on Hunger recognizes the important benefits which could result from eradication of Guinea worm disease and makes the following recommendations to strengthen the U.S. response to this problem.

(1) The U.S. Government should commit itself to exercising leadership in a coordinated international campaign to eradicate Guinea worm disease.

(2) AID should make eradication of Guinea worm disease a high priority in its country strategies in areas where the disease is endemic.

(3) AID resources in the agriculture and rural development, health and selected development activities accounts should be directed toward Guinea worm eradication activities.

(4) AID should serve a pivotal role in coordinating United States and other donor government involvement in concerted efforts to eradicate Guinea worm disease. AID should convene strategy-setting meetings, provide technical assistance through the WASH project and coordinate water and sanitation efforts in endemic areas.

(5) The Centers for Disease Control's expertise in surveillance and epidemiology should be integrated into Guinea worm eradication activities undertaken by AID.

(6) WHO's role in surveillance and technical assistance in the eradication campaign should be supported and AID should work to

complement WHO activities in this sphere to the fullest extent possible.

(7) Maternal and child health activities carried out in conjunction with Public Law 480 food assistance programs should include water and sanitation education in countries where Guinea worm disease is endemic.

(8) Local currencies generated through Public Law 480 sales or monetization of commodities can be used for water and sanitation education activities; this should be a priority use of such funds.

(9) AID should encourage PVO's operating in countries where Guinea worm disease is endemic to better include water and sanitation activities in their programs as a priority component of development assistance efforts.

DISCUSSION

Guinea worm disease is a parasitic disease which has infected human populations throughout many regions of the world for millennia. Many countries have completely eradicated the disease; but, it continues to present serious health, education, and economic problems in developing countries which do not have sufficient resources to provide safe drinking water for large segments of their populations.

DISEASE CYCLE

Guinea worm disease, by any assessment, is a terrible disease. It is contracted by ingesting water contaminated with tiny fleas known as cyclops, which harbor third-stage larvae of the Guinea worm parasite. Cyclops flourish only in standing surface water such as that found in step wells and ponds. In areas where there are surface water sources year-round, transmission usually occurs during the dry season. This is when water levels drop and the concentration of cyclops increases. In dry or semiarid areas, transmission occurs during the rainy season which is when surface sources of drinking water are present.

Once ingested, the Guinea worm parasite matures over a period of 1 year. About 6 months after ingestion, male worms die. They are either absorbed by the body or become encysted or calcified. But the greatest problems are caused by the female worms which usually migrate down to the lower limbs about 8 months after ingestion. Approximately 1 year after the initial infection, the adult female worm, which measures up to 70 cm (about 27 inches long), is ready to emerge and emit larvae. To do so, it migrates to tissue beneath the skin where it secretes a toxic substance that produces localized swelling, accompanied by intense burning and itching. Within 1 to 2 days, a painful blister develops and ruptures. The worm emerges slowly over a period of several weeks during which time the infected individual is either completely or partially disabled. Multiple infections are common, with as many as 40 emerging worms reported for a single individual. It is most common for worms to migrate to the legs and feet prior to emergence, but emergence from areas of the face and genitals and other parts of the body also has been reported. Even without secondary infection, 4 to 6 weeks are required for the lesion to heal completely, with

longer periods required for multiple infections. During this time, walking is difficult and agricultural and household work frequently must be abandoned. Secondary infection, which occurs in about 50 percent of cases, both intensifies the suffering and prolongs the period of disability.

The cycle of the disease is continued when individuals immerse affected parts of the body in water, either in the course of normal activities such as collecting drinking water, bathing or washing clothes, or to get relief from deep-seated, stinging pain and other symptoms of the disease. This action stimulates the worm to expel larvae into the water where they are ingested by cyclops. A single worm may discharge 1.4 to 4 million larvae over a period of 3 weeks. Thus, a single individual can contaminate the water supply for an entire village. About 2 weeks after the larvae are ingested by cyclops, they develop into the infective third stage which, in turn, develop into Guinea worm disease when consumed in drinking water by humans.

MAGNITUDE OF THE PROBLEM

Endemic areas

Guinea worm disease is prevalent in 19 African countries but it is most severe in the West African countries of Benin, Burkina Faso, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, and Togo. Serious Guinea worm disease problems also exist in areas of East Africa (Ethiopia, Sudan, and Uganda), as well as in some states in India and Pakistan, and it is suspected that small foci of the disease exist in Yemen.³

Guinea worm disease is primarily a rural problem. This fact partially explains the relative obscurity of the disease as well as its continued prevalence. Because past investments in water supply development have been targeted toward urban areas, the prevalence of all water-borne diseases tends to be less among urban populations than among rural populations. The International Drinking Water Supply and Sanitation Decade initiative is focused primarily on rural populations and advocates exploitation of ground water by shared wells or standpipes rather than development of more costly piped water systems.

Prevalence patterns

Few data pertaining to Guinea worm disease are available in most countries. Therefore, precise numbers and locations of contaminated water sources, as well as the specific villages, towns, and size of the populations which are affected by Guinea worm disease are unknown. In some countries, such as Uganda, the disease is thought to be restricted to specific regions, while in countries such as Burkina Faso and Nigeria, it is known to exist in every province and state. In fact, Nigeria with its estimated 2.5 million cases per year, probably accounts for one-fourth of all Guinea worm disease which occurs outside of India.

³ Paul, J., R.B. Isely, G.M. Ginsberg, *Cost-Effective Approaches to the Control of Dracunculiasis*, WASH Technical Report No. 38, Water and Sanitation for Health Project, Arlington, Va., 1986.

From the limited data which are available, it is estimated that of the villages without safe drinking water, 5 to 10 percent have dracunculiasis. The population at risk is estimated to be greater than 140 million, with annual cases numbering around 10 million. However, these estimates are based on data which are incomplete, derived largely from passive surveillance and, in some cases, dated. The true magnitude of the problem may, in fact, be larger than is estimated at present. Clearly, well-targeted efforts to eradicate the problem will require better data and improved surveillance. Work currently underway in Burkina Faso, Benin, Togo, Ivory Coast, Mauritania, Niger, and Uganda to map sources of water contaminated with the disease-carrying organisms and to survey the annual incidence and prevalence of the disease are important initial steps in mounting effective action to eliminate the disease.

India is the first country in recent years to have undertaken a systematic active search for cases of dracunculiasis. Active surveillance revealed that the prevalence of the disease in India was much greater than had been suspected initially. Passive surveillance identified only 2,729 cases of Guinea worm disease in 1980. When active surveillance became fully operational in 1983, the number of cases was found to be 44,926. India has achieved dramatic reductions in the annual incidence of the disease in a short time by targeting its available resources to the most hyperendemic areas. A 10-percent reduction was achieved between 1983 and 1984, and an additional 25 percent reduction in the number of annual cases was achieved during 1985. Annual incidence decreased from 44,926 cases in 1983 to 30,134 in 1985. The total number of affected villages declined from 11,211 to 7,600 over the same time period.

In many countries where the disease is endemic, dracunculiasis is not an officially reportable disease. In Togo, less than 4 percent of Guinea worm cases seen by medical personnel in 1977 were reported. And, during a recent visit to Pakistan to investigate the magnitude of the Guinea worm disease problem in that country and to explore possible involvement of the Carter Center's Global Health Consultation Program in efforts to eliminate the disease, former President Jimmy Carter visited an area where only two cases had been reported but one health worker had treated about 1,200 cases. Overall, it is estimated that as few as 1 percent of infections are reported.

Those who are infected have few incentives to seek medical treatment. Traditional management of the disease involves winding a few centimeters of the emerging worm around a stick each day and covering the infection with cloth, leaves, or other material. Except for preventing secondary infections, modern medicine offers no cure and no treatment which substantially alleviates the physical and emotional suffering caused by the disease. "Conventional wisdom" holds that modern medicine can do nothing and that one should wait in one's house until the disease passes by itself. In Anambra State, Nigeria, of 3,641 cases examined by epidemiologists, only 183 (5 percent) had visited a hospital or health center for treatment. And in Rajasthan, India, a survey in 1978-79 identified 985 patients with the disease, none of whom had visited a health center.

In Burkina Faso, clinical studies have been carried out in a number of villages where the disease is known to be endemic. Although less than a complete enumeration, these studies are useful for documenting the patterns of emergence and progression of the disease, as well as the incidence, prevalence, and disability among different age groups within the villages. In the Burkina villages of Mitteredougou, Nofesso, and Panga, village sanitation agents surveyed 1,696 persons in a total population of 3,374 in 1982. Of this sample 591 were found to have been infected with Guinea worm disease during the year.⁴ In other words, the prevalence among the surveyed population was about 25 percent. Infection does not confer immunity. Therefore, the same individuals can be and frequently are reinfected year after year, regardless of how many times they have been infected previously or how many worms emerge at the same time. In the Burkina Faso study, of 1,696 individuals, only seven over the age of 45 reported that they had never been infected.

The disease was found to be most prevalent among the 16-45 year age group—the group having responsibility for the largest number of agricultural activities. Of those infected in 1982, 90 percent reported that the disease appeared during the rainy season which is the peak phase of agricultural activities. More than 95 percent of the patients reported that they had had a period of total disability associated with their infection. The length of this period ranged from 10 to 150 days, with an average of 17 work days lost per person.

As a result of activities initiated by the International Drinking Water Supply and Sanitation Decade, knowledge of the severity and patterns of the disease has increased. For example, it was known that Guinea worm disease was a substantial problem in Pakistan, Sudan, and Ethiopia, but no data were available to qualify the extent of the problem. Recent factfinding missions have begun to elaborate the size of the problem. Table 1 presents a summary of current knowledge concerning the severity of the Guinea worm disease problem in specific endemic countries in Africa and Asia.

Economic, educational, and nutritional implications

Inasmuch as the period of peak Guinea worm infection coincides with the period of peak agricultural activity, the immediate economic impact of the disease is in the form of lost agricultural production. The degree of impact depends on the prevalence of the disease; whether the disability is total or partial; the duration of the disability; the agricultural activities which are impacted; the degree of involvement in agricultural activities; and the extent to which other members of the household or village can compensate for diminished productivity of those who are disabled.⁵

⁴ Guiguembde, T.R., M. Kagone, T. Compaore, P. Meda, C.D. Sokal, P. Lozac, and J. Roux, *Epidemiological Studies and Control of Dracunculiasis in Humid Savanna Zone (South-West of Upper Volta)*, Technical Document No. 8382, Muraz Center, Bobo-Doulasso, Upper Volta, 1983.

⁵ Ward, W.B., "The Impact of Dracunculiasis on the Household: The Challenge of Measurement," in *Workshop on Opportunities for Control of Dracunculiasis*, National Academy Press, Washington, D.C., 1985.

The most critical agricultural activity is sowing of crops which, in many areas of Africa, is timed to occur shortly before or at the beginning of the rainy season. This usually occurs in late May or early June and is the period of peak Guinea worm infection in many countries. July and August are devoted to cultivation, and harvesting of crops usually is done in October and November. Guinea worm infections may limit agricultural output if labor for cultivation is limited, but greater negative impacts result from limitations on sowing and/or harvesting crops. Farmers who are unable to sow or harvest their crops may have to forego an entire year's income and will be dependent on others for foods for themselves and their families.

Estimates of the magnitude of impact of Guinea worm disease on the agricultural sector are relatively scarce, but those that exist either estimate lost workdays or the value of lost production. For Togo, it is estimated that the number of lost workdays may be as high as 40 million. And, in the Sudan, uncharacteristically low agricultural output from one region was linked to results of recent surveys which confirmed an average disease prevalence of 25 percent. In India, when Guinea worm infections exceeded 44,000 cases per year, an estimated loss of 7 million workdays per year was attributed to the disease. More recent estimates place the annual loss of workdays in India caused by Guinea worm disease at 10.6 million.⁶

Estimates of the value of lost agricultural productivity and wages vary. A 1982 World Bank estimate set the value of the global loss of marketable goods caused by Guinea worm disease to be as high as \$1 billion per year. Ward⁷ estimated an annual loss of \$56 to \$277 million in wages. A study in progress in Burkina Faso suggests that for that country, annual losses from Guinea worm disease may amount to as much as 10 percent of the per capita income. For a village of 500, annual costs of the disease would be greater than \$9,000. A lower estimate was reached by the Water and Sanitation for health project [WASH] which is funded by the Agency for International Development [AID] to provide technical assistance to developing countries on water supply and sanitation issues. Assuming the value of lost production to be \$1.17 per day, a disease prevalence of 36.3 percent among the working population, and an average of 15.4 lost workdays per infected worker, WASH estimated the annual cost of the disease in lost agricultural production for a village of 500 to be about \$2,160.

In addition to costs of lost productivity and foregone agricultural output, costs of treatment can be significant. Although Guinea worm infections usually are managed without the benefit of modern medicines, the costs of treatment (primarily for drugs and bandages), have been shown to range from \$17 for an uncomplicated case to \$147 for a very complicated case, in situations where treatment is available.

Guinea worm infections among school age children, as well as increased responsibilities for agricultural and household activities be-

⁶ World Health Organization, *Dracunculiasis in Africa*. Final Report on a Workshop held in Niamey, Niger 1-3, July 1986.

⁷ See footnote 5, p. 7.

cause other family members are disabled cause considerable school absenteeism and failure. In fact, Guinea worm disease is the major cause for missed school in endemic areas. In Burkina Faso, the peak period of disability occurs during June and July which is the period of school examinations. Student absenteeism during this period leads to failure of examinations, repeated grades, and termination of education.

A study of 13 schools in Nigeria conducted in 1979 found that absenteeism increased to 60 percent during the height of the Guinea worm season from an average of 13.2 percent during the rest of the year. In another study of four primary schools in Idere, a village in southwestern Nigeria conducted during January and February of 1982, 21 percent of the students were found to be infected with the disease. Infected pupils were absent from school for an average of 9 weeks, compared with an average of 1 week for other illnesses. And, for 90 percent of the students who dropped out of school, Guinea worm disease was the principal contributing factor.

STRATEGIES TO ELIMINATE GUINEA WORM DISEASE

There is no question that Guinea worm disease can be eradicated. There are numerous cases, in fact, where it has been eliminated from a village or region by one or a combination of strategies which attack the problem either by preventing contamination of drinking water or preventing infection from ingesting water which is contaminated. Personal control measures and health education are intended to eliminate the contamination of water supplies and infections as a result of ingesting contaminated water, as well as to support or enhance other strategies. Treatment of existing water supplies with the chemical temephos prevents infection by killing cyclops, the host/agent of the Guinea worm larvae which is the vector for transmission of the disease. Provision and maintenance of safe sources of drinking water likewise will prevent infection. Finally, effective targeting of resources and determination of effectiveness of any strategy used to combat Guinea worm disease requires epidemiological surveillance to identify the dynamics of the disease within regions or areas.

The effectiveness of the three approaches, varies as do the costs. Provision of safe sources of drinking water, which is the most costly alternative, is the most effective strategy for eliminating Guinea worm disease. Greater benefits in the form of increased agricultural production and improved attendance and performance in school also result from water supply development strategies than from other, less effective strategies. In addition, water supply projects lead to higher cash incomes, increased and more reliable subsistence, and improved health. In addition to Guinea worm disease, more than one-half of all other diseases in the developing world are associated with unsafe and inadequate supplies of water. Infant diarrhea caused by impure water is responsible for 15 million childhood deaths a year. By improving access to water, the amount of time spent by women and children collecting water for the household is decreased and freed for alternative income, family and educational activities.

The discussion which follows summarizes the components and alternative strategies for eradicating Guinea worm disease. Estimates of costs for each component and strategy are presented also. The costs, estimated by the WASH project, were developed for a hypothetical set of villages in an inland country in Sub-Saharan Africa. The cost estimates are derived on the assumption that an entirely new start-up of projects and activities is required to eradicate Guinea worm disease. In fact, in many cases Guinea worm eradication efforts can be added on to existing projects and activities, and thereby minimize the costs required to eliminate the disease, while potentiating the benefits which accrue from those projects.

Health education and personal control measures

Misconceptions surround the case of Guinea worm disease. In various countries it is thought to be caused by a "spell" or provoked by a sorcerer or enemy. The concept of germs, the role of various factors in disease transmission, and the relationship between water uses and infection may not be immediately understood by residents of remote villages. Even in cases where causes are understood, individuals may lack the resources and/or knowledge to modify behaviors to eliminate the disease. Therefore, health education is an essential component of any strategy to eliminate the disease. One of the lessons learned from past water supply development projects is that putting the technology in place to provide safe drinking water may not have intended outcomes unless the residents are motivated to change their water use behaviors.

In the case of Guinea worm disease eradication efforts, the differences in successful outcomes in India and Pakistan noted by UNICEF are thought to be explained by the integration of appropriate health education in India's strategy and a lack of health education in Pakistan's strategy. In the Ivory Coast, dramatic decreases in the incidence of the disease followed the addition of a health education component to a program which had previously entailed only development of sources of safe water supplies. Furthermore, Guinea worm disease eradication provides an excellent point for initiating health education efforts. Unlike many other diseases and illnesses, in the case of Guinea worm disease, a visible worm serves as a dramatic focal point for explaining the positive benefits to result from a change in water use and sanitation behaviors.

Just as the technology of supplying water needs to be tailored to the specific geological and socioeconomic characteristics of a village, planning and education require tailoring to cultural and other characteristics of the population. Appropriate health education requires an understanding of community values in terms of meanings attached to specific diseases, how illness is defined, what notions of prevention and causes exist, knowledge of treatment techniques, how illnesses are linked with other aspects of the culture, who has primary responsibility for various activities which

pertain to the transmission or control of the disease, and what perceived risks and costs are associated with changing behaviors.⁸

In developing countries, women have the primary responsibility for providing water for household use and making the decisions concerning families' water use.⁹ The most successful water supply and sanitation projects have been those which not only direct health education toward the women in the villages but include them in the planning and design of projects and provide them with knowledge and tools for operating and maintaining the systems. However, because much Guinea worm infection occurs when farmers consume contaminated water from ponds and other water supplies located near fields, men also must receive health education and instruction in personal measures which can be taken to control the disease. The WASH report estimates the costs of community education/participation to be \$347 per village per year.

The primary personal control measures which have been shown to be effective in controlling Guinea worm disease are boiling or filtering water and avoiding immersion of affected parts of the body in sources of drinking water. Because firewood and other sources of fuel are costly and in short supply in many endemic areas, filtering to remove cyclops is the most widely recommended personal measure for preventing ingestion of contaminated water.

Advantages of filtering include its simple technology, portability, and low cost (cost per sieve is estimated to range between \$0.50 and \$0.80 depending on the material). A highly recommended fabric for filtering is 100 micron mesh monofilament nylon gauze which has been shown to effectively remove cyclops from water, resist clogging from silt and cyclops, and have no effect on the taste. However, its continued effectiveness depends on keeping the filter medium clean, which itself requires washing in safe water. Another disadvantage is that since filtering is time consuming and therefore is likely to be most effective if it has to be sustained for only a limited time of the year such as in areas where transmission occurs during specific months rather than year-round.

Preventing contamination or recontamination of water supplies is an equally important strategy for controlling Guinea worm disease. When patients refrain from immersing their infected wounds in drinking water supplies, the annual incidence of infection drops. However, one individual can contaminate an entire water supply. As in the case of filtering, the success of such strategies depends to a large extent on an informed and motivated population. Thus, health education is at the core of this strategy.

Chemical treatment of water supplies

Treatment of open water sources at monthly intervals with a chemical, temephos, during the transmission season can produce substantial reductions in the incidence of Guinea worm disease. Properly applied, temephos is described as being colorless, tasteless and odorless, and safe. Factors such as country infrastructure, ca-

⁸ Yacoob, M., "Women and Participation in Health Education for Water and Sanitation: An Operational Approach for Moslem Communities." International Congress for Tropical Medicine and Malaria, Calgary, Canada, September 16, 1984.

⁹ Roark, P.D., "Women and Water," in P. Bourne, eds., *Water and Sanitation: Economic and Sociological Perspectives*, Academic Press, Inc., 1984.

pability to maintain long-term supply, feasibility of maintaining ongoing programs, and transportation requirements determine the appropriateness of chemical treatment.

In a village of about 3,700 in India, the number of cases decreased from 375 to 10 within 1 year after treatment of the village's solitary source of drinking water was initiated. In a neighboring village with no treatment, the incidence of infection declined only 11 percent over the same period.

The costs of village-level training, purchases and storage of chemicals, and associated costs for treating water supplies with temephos, have been estimated by the WASH project to average about \$68 per year for a village of about 500 people, assuming three applications of temephos are required each Guinea worm season. In addition, baseline surveys to determine the feasibility of chemical treatment and other tasks required to implement the strategy would add an additional \$100 to the cost of such an approach, bringing the total cost to about \$168 per village per year. At least 2 years of chemical treatment would be necessary in order to disrupt the cycle of Guinea worm disease.

Finally, the success of chemical treatment of water with temephos is highly dependent on a well-informed and cooperative population. Therefore, costs of health education must be added to the costs of chemical treatment in determining the total costs for this type of intervention.

Development of safe community water supplies

The most favored and most reliable strategy for eradicating Guinea worm disease is development of safe community water supplies. This is the foundation of the Government of India's highly successful Guinea worm eradication program and is the cornerstone for many other programs which are being defined currently.

Alternative types of community water supplies can be developed depending on local hydrologic and geologic conditions. Some types of systems are more resistant to contamination and thus are more reliable for maintaining a Guinea worm eradication effort, but the costs vary also. Systems using tube wells are the most technologically complicated, the most expensive, and the most reliable. Tube well construction costs are estimated to average \$9,444. Dug wells are less technologically sophisticated, and less costly (averaging about \$2,149 per well), but they also are more likely to be contaminated. Costs for capped springs and gravity systems are in about the same range as dug wells.

AID and WASH estimate the costs for providing improved water supplies to Guinea worm endemic areas to average about \$6,056 per village. However, unlike the other control strategies, improved water supplies produce benefits which go beyond those associated with elimination of Guinea worm disease. Most water supply projects have a goal of providing enough water to assure an availability of 20 liters per person per day. This is far greater than the amount of water currently consumed by many in remote rural areas, but is considered to be the minimum essential for sustained health. Thus, improved health and cleanliness can be expected to result from increasing quantities of water available for consumption and household tasks. A second benefit occurs in the form of

time savings resulting from improved access to water. It is not unusual for women in developing countries to spend 4 to 6 hours of their workday seeking and carrying water for household consumption. The time saved by the carriers of water represents a resource freed for alternative household, agricultural, or educational purposes. And, direct health benefits in the form of reduced incidence of diarrhea, schistosomiasis, and other water borne diseases will be manifest in decreased rates of infant mortality and improved productivity of the population.

Epidemiological surveillance

Epidemiological surveillance and monitoring are essential components of any effort to eradicate Guinea worm disease. Initial baseline surveys are needed to identify the location of contaminated water sources, the prevalence of the disease, and the environmental factors relevant to an effective eradication strategy. The surveillance activity presents an opportune time to inventory required and available resources, as well as existing or required institutional infrastructure and coordination to attack the disease. Follow-up surveys are essential for determining the extent to which strategies are being implemented and their effectiveness in eradicating Guinea worm disease.

Estimates of the costs of surveillance prepared by WASH for AID for a hypothetical group of 100 villages suggest the annual cost of surveillance averaged over 2 years to be about \$94 per village.

Summary

Experts in the field contend that health education and epidemiological surveillance activities are essential for any strategy to eradicate Guinea worm disease. Thus, there are essentially three basic options which can be followed to control or eliminate the disease: use of filters and other personal control measures, vector control based on chemical treatment of drinking water, and development of protected and safe sources of water. The costs of these options vary as do the benefits.

CURRENT NATIONAL AND INTERNATIONAL EFFORTS TO ERADICATE GUINEA WORM DISEASE

Although Guinea worm disease has been a low public health priority for much of the recent past, current attention to the problem largely results from activities initiated in connection with the International Drinking Water Supply and Sanitation Decade. Increased knowledge of the extent of the disease and strategies for eliminating it have resulted from collaborative efforts between and among endemic countries, as well as efforts between international donors and endemic countries. Noteworthy among these are the first African Regional Workshop on Dracunculiasis held in Niamey, Niger, in July 1986, and the workshop on Opportunities for Control of Dracunculiasis sponsored by the National Research Council and WHO in 1982. It is clear that eradication of Guinea worm disease requires continued cooperation and increased resources from both international donors and governments of countries in which the disease is endemic.

National efforts

Involvement and commitment of national decisionmakers are essential for eliminating Guinea worm disease. A national plan of action or strategy which identifies the prevalence and locations of the disease, existing program infrastructure, ongoing and scheduled activities which will impact the disease and additional resources and efforts needed for complete elimination is an important first step in structuring national priorities. Ten of the 19 endemic countries in Africa have developed national plans of action. Progress and actions initiated by national governments to date are summarized in table 2.

Efforts by international donors

Donor countries and international agencies remain an important source of technical and financial resources in the battle against Guinea worm disease. In the United States, the Water and Sanitation for Health [WASH] project, funded by the Agency for International Development [AID], and the Centers for Disease Control [CDC], recently designated as a WHO Collaborating Center for Research, Training, and Control of Dracunculiasis, have provided monitoring and evaluation information pertaining to this problem and efforts to eliminate it. They are an important source of technical assistance and offer considerable expertise for guiding future strategies.

AID provides support for a number of projects which are directed specifically toward eradicating Guinea worm disease as well as for activities which indirectly contribute to its elimination. Ongoing water and sanitation projects aimed at eradicating Guinea worm disease are funded by AID in endemic areas in Benin, Burkina Faso, Cameroon, Togo, and India. Other activities related to Guinea worm eradication are supported by AID in Gambia, India, Pakistan, Somalia, and the Sudan. AID-funded water and sanitation projects in Chad, Mali, Niger, Senegal, and Uganda are not located in endemic areas.

A preliminary survey conducted for the Select Committee on Hunger by WASH to identify projects currently being funded by other agencies which either have Guinea worm elimination as an objective or are being implemented in known endemic areas identified 80 water and sanitation projects in 13 countries. Among these 80 projects, about one-half of all funds are provided by UNICEF. India receives the most funds. In Africa, Togo and Burkina Faso are the major recipients.

CONCLUSIONS

The Select Committee on Hunger recognizes that the economic and health status of several hundred million residents of developing countries is inextricably linked to an expansion in the quantity and an improvement in the quality of water supply and sanitation facilities. A particularly deplorable water-borne disease that embodies the adverse effects of inadequate and unsafe water supply on health, agriculture, education, and the general quality of life in affected areas of Africa and southern Asia is Guinea worm disease.

There is no question that Guinea worm disease can be eradicated. Health education and epidemiological surveillance, combined with development of safe water supplies, chemical treatment of water, and/or use of special filters can eliminate the disease and provide other benefits. The effectiveness of these strategies has been widely documented by the successes of eradication programs in Ivory Coast, India, and other countries.

The U.N. International Drinking Water Supply and Sanitation Decade presents a special opportunity to bring together host and donor countries for a concerted effort to interrupt transmission of Guinea worm disease and thus eradicate it. Although the disease will not be eliminated completely by the end of the decade in 1990, actions can be taken which will set in motion a program of resource mobilization, cooperation, and national commitment to bring about an end to Guinea worm disease.

It is clear that eradication of Guinea worm disease requires continued commitment, cooperation, and increased resources from both international donors and governments of the countries in which the disease is endemic. Previous experience with collaborative international efforts targeted toward specific development problems and access to technical expertise and other resources, places the U.S. Government and its Agency for International Development in a position to play a leadership role in eradicating Guinea worm disease.

TABLE 1.—SUMMARY OF CURRENT KNOWLEDGE CONCERNING GUINEA WORM DISEASE
IN SELECTED ENDEMIC COUNTRIES

Benin

Disease is officially reportable.

48 percent of 1,412 villages visited by hydrologists in 1983 reported dracunculiasis infections.

In some villages, the prevalence is 26 percent.

Burkina Faso

Peak period of endemicity is June to September.

In endemic areas, the annual attack rates range from 10 to 70 percent.

All provinces are affected.

Cameroon

Disease is officially reportable.

Disease occurs primarily in the northern Mandara mountain areas, but scattered foci were discovered recently near the Nigerian border.

1,650 cases were reported in 1983; 691 cases were reported in 1984.

The country may be on the verge of achieving nationwide eradication; only small foci of the disease exist.

Central African Republic

Data are very poor.

Chad

Data are very poor; the most recent data are from 1978 when 55 cases were reported.

Ethiopia

Disease is officially reportable, but it is underreported.

Only 770 cases were reported for the entire country in 1985.

In recent years, 11 of the 15 provinces reported the disease.

Gambia

Only small foci of the disease exist.

Guinea

May be on the verge of achieving nationwide eradication.

The last known cases were reported in 1969, but the disease is not officially reportable.

Ivory Coast

The total number of annual cases reported by active surveillance decreased from 67,123 in 1966 to 4,971 in 1976 and to 592 in 1985.

In Dimbokro district the prevalence of the disease decreased from 30 percent before wells were drilled to 1 percent after they were drilled.

Guinea worm disease may be eradicated by 1987.

Kenya

Only small foci of Guinea worm disease exist.

Mali

Data are very poor.

Mauritania

The disease is most prevalent in areas in the eastern part of the country.

Wells in the villages of Nema and Oulatta are contaminated with Guinea worm.

It is estimated that half of the population of Oulatta is infected with the disease.

Nigeria

The annual number of cases is estimated to be 2.5 million; 400,000 cases are estimated to occur annually in Anambra state.

Nigeria probably contains 25 percent of all cases of Guinea worm disease found outside of India.

The ASA Dam, built to relieve the acute scarcity of water in the city of Ilorin is thought to have increased the incidence of Guinea worm disease in rural areas of Kwara state.

70 percent of economically productive adults in three communities in Babana district, Kwara state were disabled by Guinea worm disease in 1982-83; 55 percent were severely incapacitated and 83 percent of the infected had multiple infections.

In Egbejila the prevalence of Guinea worm disease was found to be 45 percent in 1983; 55 percent of the infected were incapacitated to the extent that they could not perform their daily tasks.

Sudan

Guinea worm disease is known to exist in the southern region, but no estimates are available on the prevalence there.

A survey of 3,332 persons in 18 villages in central Sudan conducted by UNICEF in September 1986 found that the prevalence ranged from 1 to 79 percent with an average of 24.6 percent.

Prior to the UNICEF surveys, the most recent report had been filed in the 1940s.

Togo

The annual incidence of Guinea worm disease is estimated to have been in excess of 440,000 cases in 1982, but the numbers of reported cases were only 1,839 and 1,456 in 1984 and 1985, respectively.

A survey of Bassar, Haho and Zio prefectures in February 1984, identified seven villages infected with Guinea worm; prevalence of the disease ranged from 24 to 83 percent of the population.

Transmission begins at the beginning of the dry season or the beginning of the little rainy season, depending on location.

Uganda

Guinea worm disease is officially reportable.

Population at risk is estimated to be 3.05 million.

6,230 cases were reported in 1984; 4,070 cases were reported in 1985.

The disease occurs primarily in the northeast part of the country but appears to be spreading to other areas.

India

The disease is now limited to six states.

In 3 years of operation, India's eradication program reduced the incidence from 44,443 cases in 1983 to 30,134 cases in 1985.

Pakistan

It is not known how extensive or how intensive the Guinea worm problem is in Pakistan at this time, but at least 8.2 million persons are believed to be at risk.

13,781 cases of Guinea worm disease were reported in Punjab province in 1980.

A 1985 survey of 11 villages in Bannu containing 24,000 persons found 232 active cases and 5,095 healed cases.

The transmission season is from mid-May to mid-September.

TABLE 2.—NATIONAL EFFORTS TO CONTROL GUINEA WORM DISEASE

Benin

The national plan for control of dracunculiasis is based on providing safe sources of drinking water, health education, and some use of temephos.

A national survey to define the extent of the disease is under way.

Construction of 2,400 wells by 1987 is planned.

Burkina Faso

A National Commission for the Control of Dracunculiasis was established in 1985.

The plan of action includes an intensive 4-year phase and a lower cost (4-6 year) alternative.

Cameroon

Began using temephos to treat water in 1984.

Considering a comprehensive plan of action similar to Burkina Faso's.

Ethiopia

No control strategy or national plan of action has yet been developed.

Ethiopia intends to integrate the attack on dracunculiasis with its vectorborne disease control program addressing malaria and other diseases.

Ghana

Agreed to host the Second African Regional Workshop on Dracunculiasis to be held at Accra in March 1988.

A project to control dracunculiasis and schistosomiasis in a district in the northern region of Ghana has been initiated.

Components of the Ghanaian control strategy, to be implemented as primary health care activities, include an initial baseline epidemiologic survey, training of village health workers and other field workers, and control measures which emphasize health education, vector control, and evaluation.

Guinea

Began an extensive rural water supply program in the mid-1960's.

A survey is needed to determine whether the disease is already eliminated.

Ivory Coast

Provision of safe water supplies backed with health education is the principal strategy followed since 1982 to control the disease.

More than 10,000 rural wells were built between 1973 and 1983.

Expected to provide wells to deliver the recommended 20 liters of water per person per day by 1985.

A systematic active surveillance is being conducted in all endemic areas.

Mauritania

Planned survey and control efforts in endemic areas have been initiated.

Niger

Government has developed a national plan of action against dracunculiasis and schistosomiasis.

Nigeria

Priority in the provision of safe drinking water is being given to villages where Guinea worm disease is endemic.

Convened its first national conference on dracunculiasis in March 1985 under the auspices of the Federal Ministry of Health, UNICEF, WHO, and the University of Ilorin.

The National Youth Service Corps has agreed to assign doctors and nurses to nationwide surveillance and control of dracunculiasis.

An aggressive effort was initiated in Anambra state in October 1986, to eliminate dracunculiasis.

Senegal

Support is being sought for a national survey to define the extent of Guinea worm disease.

Sudan

The Ministry of Health and UNICEF will implement health education and water supply projects in the area surveyed last fall.

Togo

Social Affairs Division of the Ministry of Public Health has implemented extensive health education and promotion projects in hyperendemic areas.

Planned to drill 1,500 wells by the end of 1985; 280 wells were completed by the end of 1983.

An eradication program was initiated in the Plateau Region in 1985, the Maritime Region in 1986, and is scheduled to begin in the Central Region in 1987.

Uganda

Eradication strategy, developed in 1983, emphasizes developing safe supplies of water, health education, surveillance, and treatment of patients.

India

India has a fully operational Guinea worm eradication program in operation.

The target date for eradication of Guinea worm in India is 1990.

By the end of 1985, 75 percent of Guinea worm infected villages had been provided with safe water supplies.

Pakistan

The president and prime minister (who is from an endemic area) are committed to eradicate the disease.

The seventh 5-year plan, scheduled to begin July 1, 1987, provides for increased support for water and sanitation improvement and will include a strong attack on Guinea worm disease.



100th Congress
1st Session

COMMITTEE PRINT

ALLEVIATING WORLD HUNGER: LITERACY
AND SCHOOL FEEDING PROGRAMS

SELECT COMMITTEE ON HUNGER
U.S. HOUSE OF REPRESENTATIVES



MARCH 1987

Printed for the use of the Select Committee on Hunger

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1987

70-812

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

H962-7

SELECT COMMITTEE ON HUNGER

MICKEY LELAND, Texas, *Chairman*

TONY P. HALL, Ohio
BOB TRAXLER, Michigan
LEON E. PANETTA, California
VIC FAZIO, California
SAM GEJDENSON, Connecticut
PETER H. KOSTMAYER, Pennsylvania
BYRON L. DORGAN, North Dakota
BOB CARR, Michigan
TIMOTHY J. PENNY, Minnesota
GARY L. ACKERMAN, New York
MIKE ESPY, Mississippi
FLOYD H. FLAKE, New York
JAMES H. BILBRAY, Nevada
KWEISI MFUME, Maryland
ELIZABETH J. PATTERSON, South Carolina

MARGE ROUKEMA, New Jersey
BILL EMERSON, Missouri
SID MORRISON, Washington
BENJAMIN A. GILMAN, New York
ROBERT F. (BOB) SMITH, Oregon
DOUG BEREUTER, Nebraska
FREDERICK S. UPTON, Michigan

LETTER OF TRANSMITTAL

U.S. HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON HUNGER,
Washington, DC, March 1987.

To Members of the Select Committee on Hunger:

I am pleased to transmit to Committee Members the enclosed report, "Alleviating World Hunger: Literacy and School Feeding Programs."

The first part of the Committee Report addresses the vital role education of girls plays in the social and economic development of less developed countries. The second part elaborates on the important benefits of school feeding programs as part of United States food aid initiatives. Both literacy and school feeding efforts are vital elements in the overall strategy of alleviating immediate as well as long-term hunger and malnutrition problems. I commend your attention to the recommendations which follow each discussion topic.

Sincerely,

MICKEY LELAND,
Chairman.

CONTENTS

	Page
Letter of transmittal	III
Part I Female Education and the Alleviation of World Hunger	
Executive summary	1
Specific benefits of female education	2
Female education--The problem	6
Assistance to basic education	7
Recommendations	9
Part II School Feeding Programs in Developing Countries	
Introduction	11
Summary and recommendations	12
Discussion: Impacts of school feeding programs	14
Program phase-overs	20
Conclusion	22
School feeding in Haiti	23
School feeding program by volunteer agency (VOLAG), fiscal year 1981 (table)	24
Recipients of title II and school feeding assistance in Haiti (selected years)	25
(table).....	25
School feeding in India	25
Recipients of title II and school feeding assistance in India (selected years)	27
(table).....	27
References	27

PART I

FEMALE EDUCATION AND THE ALLEVIATION OF WORLD HUNGER

EXECUTIVE SUMMARY

Evidence evaluated by the Select Committee on Hunger leads to a strong conclusion that increased education of women and girls can be a powerful tool in combating world hunger. By improving nutritional status, increasing economic productivity, decreasing fertility, and improving the status of women, the education of girls, many of whom will become mothers, works to decrease hunger within families, and to increase child survival.

Both common sense and research support the conviction that education is necessary to promote the social and economic development of people and nations. Education develops the necessary knowledge, skills, and productive capacities of the work force, providing skilled labor for both the industrialized and informal sectors of the economy. Education allows for improvements in the distribution of income and employment, and substantially increases the effectiveness of investments in other development sectors.

Furthermore, recent analyses by the World Bank, the Agency for International Development (AID), UNICEF and others make it clear that investments in education of women and girls have particularly dramatic potential for addressing some of the underlying causes of world hunger. The impact of a woman's educational level on nutrition, health, fertility, and agricultural productivity has important implications for development assistance to low-income countries around the world.

Many international education specialists agree that resources in support of basic education services will assist to raise the level of education services to girls and women as well as or better than specially gender-targeted services. Therefore, recommendations for actions to improve female education address the needs of basic education services overall.

For the purposes of this report, the term "basic education" refers to elementary, secondary, and adult and community education. Elementary or primary education refers to the first 8 years of schooling, and secondary refer to subsequent education in community-based schools. Female and maternal education refers to basic education for girls or women.

Policy recommendations for enhanced support of basic education efforts include:

- reinstating basic education as a high level priority for funding allocations in the education sector of AID;
- targeting expansion of basic education programs in countries with low enrollment rates and high drop-out rates for both boys and girls;

- incorporate strategies to address the schooling needs of girls and adult women into education plans, such as scholarships for girls, housing for female teachers or boarding rooms for female students, and provision of child care services;
- focus curricula on knowledge and skills that recipients identify as important, which could include health, food production, and income-generating activities;
- support continued congressional appropriations for the World Bank's International Development Association replenishment and for voluntary contributions to UNICEF, both important funders of basic education activities; and
- restore funding for basic education activities at AID to 50 percent of education programming in the section 105 account.

SPECIFIC BENEFITS OF FEMALE EDUCATION

Education of girls and women reduces child hunger and increases child survival by favorably affecting nutritional status, economic productivity, fertility, and women's status.

A. Nutritional status

By decreasing malnutrition, maternal education is clearly a powerful force in the direct alleviation of hunger. A thorough review of studies examining the impact of female education on child health concludes that maternal education is closely related to child health whether measured by nutritional status or infant and child mortality. Mothers of malnourished children are more often illiterate (61 percent) than are mothers of well-nourished children (49 percent).

A World Bank study has calculated that each additional year of a mother's education reduces the death of her infants by 6 per 1,000 live births. Therefore, primary education for women reduces infant mortality by 36 per 1,000 live births, and secondary education can save a total of 72 children for every 1,000 born. Similarly, the United Nations has calculated an average child mortality decline of 3.5 percent with each additional year of a mother's education. Thus, secondary education for women more than halves the infant mortality rates in most developing countries. For example, in 1979 in Kenya 163 of 1,000 children of mothers with no education died by age 2; 104 of 1,000 children of mothers with 1-7 years of education died by age 2; and 61 of 1,000 children of mothers with 8 or more years of education died by age 2.¹ Clearly, maternal education is an important force in improving child health.

Recently, maternal education has been linked to a more specific indicators of child nutritional and health status, vitamin A deficiency. Vitamin A deficiency affects, according to World Health Organization estimates, 10 million pre-school children every year.

The Select Committee on Hunger has explored the problem of vitamin A deficiency and found that respiratory and diarrheal diseases, and ultimately, malnutrition and mortality, increase dramatically among children who are deficient in vitamin A. The significance of vitamin A deficiency was not fully understood until

¹ Cochrane, Susan H., O'Hara, Donald J., and Leslie, Joanne, "The Effects of Education on Health," World Bank Staff Working Paper No. 405, July 1980.

evidence of its morbidity and mortality impacts was reviewed in Indonesia with an AID-funded study.

A study conducted by Helen Keller International in Bangladesh found that children of educated mothers were much less likely to suffer from vitamin A deficiency than were children of uneducated mothers.² The study found that when children whose mothers had no schooling at all are compared with children whose mothers had at most primary level education, the reduction in night blindness prevalence was striking. A few years of maternal education almost eliminated the age related rise in night blindness. No mother of a child with active corneal lesions due to vitamin A deficiency had been to school beyond primary level.

B. Economic productivity

The education of women greatly increases farmer food production and general economic productivity, even more so than does male education. Increased food production and improved economic conditions directly and significantly alleviate hunger.

A survey of both female and male farmers' education and efficiency showed that farmer productivity increases at least 7.4 percent after 4 years of elementary education. While education improves both male and female farmer efficiency, studies in Africa illustrate the particular economic advantage of supporting female education. A controlled experiment of 152 farmers in Kenya led to the conclusion that education increases the productivity of female farmers considerably more than that of male farmers.³ This is of particular importance as a food production intervention in Africa, where 80 percent of farming is done by women.

The World Bank has calculated that the profitability of investing in education is higher for women than for men.⁴ Female education brings many women into the labor force, female workers who would otherwise stay unremunerated at home. When the cost of primary education for both men and women is subtracted from the benefits of higher productivity, the resulting "social rate of return" to investment in primary schools averages about 30 percent. The rate of return was calculated as high as 82 percent in Venezuela, and as low as 5 percent in Morocco. Therefore, the investment in female education worldwide can expect a social rate of return of at least 30 percent and most likely a higher one. Female education is a partial and significant solution to improving Third World food production and economies, and therefore relieving the widespread hunger in developing countries.

Although farmer productivity increases with education in all populations, it is important to note that this relationship is most significant and consistent in regions where at least 40 percent of the population is literate. There appears to be a literacy rate threshold around 40 percent above which farmer productivity very consistently increases; however, below 40 percent of the population

² Helen Keller International and Institute of Public Health Nutrition, "Bangladesh Nutritional Blindness Study: Risk Factors," Dhaka, 1986.

³ Moock, P., "The Efficiency of Women as Farm Managers: Kenya," *American Journal of Agricultural Economics*, Dec. 1976.

⁴ Colclough, Christopher, "Primary Schooling and Economic Development: A Review of the Evidence," World Bank Staff Working Paper No. 399, June 1980.

is literate, farmer productivity may not increase as regularly. This emphasizes the necessity of universal education in order to trigger widespread increases in farmer productivity.

Two findings concerning the types of education associated with the greatest economic impact have considerable policy implications. First, returns on investments were substantial for all levels of education in the countries reviewed by the World Bank, but returns apparently decrease with increasing levels of education: primary education is the most favorable investment, with a social rate of return of 27 percent. Secondary education's return is less, at 16 percent, and higher education's return drops slightly more to 13 percent.

The second finding with policy implications involves curriculum. The World Bank has found that returns to education in general subjects are often higher than those for technical training. Although technically trained people may have greater productivity, the much higher cost of their technical education is disproportionate to their higher productivity; thus, general education proves more cost-effective. Furthermore, when females do attend school, they traditionally study general subjects. The investment in and expansion of this curriculum can only promote further female enrollment and attendance.

C. Fertility

It is commonly believed that slower population growth and lower fertility is essential for a country's stable economic growth. Increased birth spacing, a mechanism for slowing population growth, greatly decreases hunger and mortality of women and children. A mother with few children can devote more time and resources to each, thus having better nourished, healthier children. On the other hand, a mother with many children must spread time and resources thinly, and her children are more likely to be malnourished and sickly. Increased birth spacing contributes to the welfare of a nation's mothers and children, which extends into the economic health of a nation.

Recent evidence from a comprehensive report issued by the United Nations quantifies the impact of education for women on the number of children born.⁵ In roughly 40 percent of the countries with available information, it was found that women with 7 or more years of schooling have under half as many children as women with no education. Apparently maternal education is an extremely powerful force in fertility control.

In explaining this fertility decline, the United Nations report states that "women with 7 or more years of schooling desire 1.3 fewer children than those with no schooling." One important factor responsible for this phenomenon is that women with more than 7 years of education in countries as diverse as Kenya, Bangladesh, Portugal, and Mexico were found to be four times more likely to use contraception than those without schooling. Furthermore, women with 7 or more years of education are, on average, marrying almost

⁵ United Nations Secretariat, Department of International Economic and Social Affairs, Population Division, "Education and Fertility: Findings from the World Fertility Surveys," New York, 1986.

4 years later than their uneducated peers, thus reducing their number of childbearing years.

Educated women often want fewer children for good economic reasons. First, education increases the likelihood that a woman will be employed outside the home. Consequently, she is less willing to give up work time for extra children. Second, education reduces the economic utility of children to the family because it is likely to convert the parents from subsistence farmers in need of child labor into paid workers for whom children are mostly an additional expense. Finally, education creates aspirations for upward mobility and accumulation of wealth, which are difficult to achieve with a large family.

At one time, it was argued that female education might paradoxically increase birth rate because educated mothers tend to breast-feed their babies less and so become fecund sooner after bearing a child. However, this argument has been effectively countered by research that has repeatedly shown that the combined effects of later marriage and greater use of contraception among highly educated women more than compensates for the effect of shorter breastfeeding. Overall, educated mothers will have fewer and healthier children than uneducated mothers.

Interestingly, education levels of women are correlated with a greater reduction in fertility in urban areas than in rural areas. This differential is most likely explained by the greater access to contraceptives and family planning information among urban populations than among rural populations. Furthermore, consistent declines in fertility seem to be linked with a literacy rate threshold around 40 percent. Only one-quarter of the countries which have literacy rates of less than 40 percent show decreases in fertility with increasing levels of female education, while over three-quarters of countries with literacy rates above 40 percent show this decrease. This finding re-emphasizes the necessity for universal education in order to achieve fertility declines.

These two findings have important implications for development especially in Sub-Saharan Africa, where literacy rates are among the lowest, and fertility rates among the highest, in the developing world. The evidence would indicate that programs to slow population growth will be much more effective if basic education needs of the region are addressed at the same time.

D. Status of women and child health

The impact of maternal education on decreasing child hunger and mortality can be explained by important changes in the mothers themselves. Education of women greatly changes the traditional balance of familial relationships, with the educated woman more likely to be given higher status within her family than her uneducated peer. An educated mother is more apt to challenge the harmful traditions of her mother-in-law, who in traditional societies often has leading authority in child rearing, and the mother-in-law is less inclined to fight the challenge. Furthermore, the educated woman is more likely to communicate with her husband about family needs, and he is more likely to respond.

Educated mothers are given the courage and authority to break with tradition and adopt innovations in child care and feeding.

Educated mothers become less fatalistic about malnutrition and illness and realize that they can act to improve their children's health. Also, an educated mother is more likely to know where the health facilities are and how to use them. Given her improved ability to communicate, she is more likely to be listened to by health professionals than an uneducated mother would be.

Education affects not only a woman's knowledge, but also the way in which she approaches and deals with her family and the institutions and people who have an impact on her. An educated woman can better understand and control her life's events. Not only does an educated woman know what her child needs, but she has the confidence to assert those needs. Primary and secondary education can give a woman confidence in herself and authority in the minds of others—both invaluable qualities for her children's welfare.

FEMALE EDUCATION—THE PROBLEM

Throughout most of the developing world female literacy rates are very low, and significantly lower than male literacy rates. Generally speaking, literacy is achieved with 4 years of schooling. In less developed countries as a whole, only 50 percent of women are literate. The problem is most severe in south Asia, where only 31 percent of women are literate, Africa where 36 percent of the women are literate, and the Middle East where 46 percent of the women are literate. Respective male literacy rates are 70 percent, 59 percent, and 81 percent. Fortunately, the figures are considerably higher and the gender-ratio more equitable in Latin America, the Far East, and Oceania. However, these percentages obscure the fact that literacy rates are generally much lower in rural areas.

A low female literacy rate is a result of low school enrollment: only 43 percent of school-age girls are enrolled in primary or secondary schools in developing countries, and a scant 5 percent of these women pursue higher education. Many factors limit female enrollment in less-developed countries. Following are some of the more important barriers to female education.

Too few schools in rural areas.—Poor school access restricts girls' attendance more than boys because girls are not allowed to travel long distances alone in many cultures, and because they cannot travel long distances carrying younger siblings who are often the girls' responsibility.

Female teacher shortage.—Often female teachers are unwilling to work in rural towns or urban slums. In sex-segregated schools, this directly restricts female enrollment. Female teachers provide a female role model to exemplify the relevance of girls' education. Without female teachers, this significant motivation for parents to send girls to school is lacking.

Perceived irrelevance of education in a woman's life.—Education is not seen as useful to a woman's role as mother, homemaker, and subsistence farmer. On the other hand, education is seen as relevant to a man's role as the principle earner of family income.

Demand for girls' labor at home.—In many developing countries parents demand much more household labor from their daughters

than from their sons. Consequently, girls have much less time to attend school or study than boys do.

Parents choose to pay to educate sons before daughters.—When parents can only afford school costs (uniforms, books, transportation, and fees) for a few of their children, they are more likely to educate their sons than their daughters.

Lack of political support for the primary education of girls.—In many cultures, parents, particularly fathers, have a negative attitude toward female education, emphasizing its disruption of tradition. If local governments do not strongly support the recruitment of girls into the education system, increases in female enrollment will be slow.

Inferior sex-segregated schools for girls.—In countries where schools are sex-segregated, far more resources go to the boys' schools than to the girls' schools. Consequently, there are far fewer, and far inferior, schools for girls than there are for boys.

Girls drop out for marriage or pregnancy.—In countries where girls are attending primary school into their teens (due to sporadic though continuing attendance), they often drop out before graduation because they get married or pregnant. Boys typically marry several years later than girls, and because their attendance is more regular, they more often have time to complete school.

ASSISTANCE TO BASIC EDUCATION

Improvements in education levels for women will depend on improvements in the educational systems in developing countries overall. It is believed by many education specialists that targeting programs to girls only may exacerbate inequalities between education for girls and boys, while improvements in the education system will more likely improve girls' chances for acquiring education. Thus, increased investments in basic education are a prerequisite to improving women's literacy in less-developed countries.

The United States ranks third behind France and Germany among donor nations in the amount of development assistance funds allocated to the education sector. The 1986 report of the Organization for Economic Co-operation and Development (OECD) gives special attention to basic education, contending that this subsector is a cost-effective means of achieving educational progress, especially in rural areas. However, in spite of its emergence as an important development strategy, basic education still receives only a small share of total education funds. Bilateral programs, both those of the United States and of other donor countries, concentrate on higher, technical, and secondary education. According to the OECD, only the World Bank appears to be allocating significant amounts of resources to primary and nonformal education.

Since 1962 the World Bank has invested more than \$5 billion in about 260 education projects in more than 90 countries. This investment has helped to provide a total of 3 million school, college, or university places in more than 20,000 institutions. The Bank is investing in basic education through curricula reform, school textbooks, and other "soft" resources, as well as in building schools and

providing equipment. Current examples of World Bank investments in basic education include:

- a project in Cameroon to increase the number of qualified primary-school teachers, upgrade the skills of lower and upper secondary technical-school graduates, and improve the management of education;
- a project in Kenya to provide new primary teacher-training colleges; primary schools; equipment, specialist services, and training for the development of educational materials for delivery by mass media; and
- a project in the Solomon Islands to assist the government to improve access to and quality of lower secondary education and strengthen educational management.

Another important actor in providing basic education assistance to developing countries is the United Nation's Children's Fund (UNICEF). UNICEF devotes approximately 15 percent of its program funds to formal and nonformal education, totaling about \$40 million annually. Emphasis within UNICEF country programs is on measures to incorporate a greater number of girls and women in primary education and literacy programs. They also support special education projects for women, combining skill training for income generation with literacy and domestic activities including child care and nutrition.

The Agency for International Development's policy paper on basic education states in its introduction: "increasing the efficiency and improving the distribution of basic education and skills training are among the priorities of AID's assistance programs." AID also provides guidelines for selecting those countries to receive assistance to basic education; countries which:

- encourage both public and private schooling;
- encourage decentralized management of the school system, local participation in schools, and diversified sponsorship of schools;
- support programs that address qualitative and quantitative aspects of efficiency, adequacy, and effectiveness; and
- encourage and support increased access and opportunities for girls and other segments of the population who are deprived of access.

Funding for basic education within AID, however, has declined dramatically since 1980, when it accounted for 30 percent of the AID section 105 (Education) Account. In AID's 1987 request, basic education accounted for only 15.3 percent of the education total. While funding for basic education efforts in African have increased from 15.9 to 30.4 percent of the education funds from 1980 to 1987, in Asia basic education was reduced from 28.8 to 2.4 percent of total funding, and in Latin America and the Caribbean, basic education funding fell from 37.2 to 14.4 percent of total in the same time period.

It seems obvious that funding in the education sector is not consistent with either official Agency policy or the overwhelming evidence indicating the crucial role of basic education in development strategy. Furthermore, this reversal in funding for basic education works against reaching certain goals outlined in AID's Blueprint for Development, which include increasing primary school enrollment to above 90 percent for boys and girls, increasing the rate of

completion of at least 4 years of schooling to 70 percent, and raising adult literacy rates for both men and women to above 50 percent by the end of the next decade.

RECOMMENDATIONS

(1) The Agency for International Development should re-instate basic education as a high-level priority for funding allocations in the education sector.

(2) Countries with low enrollment rates and high drop-out rates for both boys and girls should be targeted for expansion of basic education programs.

(3) Particular strategies to address the schooling needs of girls and adult women should be incorporated into education plans. These could include financial incentives, such as scholarships for girls, additional physical facilities, such as housing for female teachers or boarding rooms for female students, and support to reduce the domestic responsibilities of young girls, such as the provision of child care services. Training of women teachers is another vital strategy.

(4) The curricula of basic nonformal educational programs should focus on knowledge and skills that women themselves identify as important. These could include content, method, and materials that best combine skills in areas such as health, literacy, and income-generating activities.

(5) Congressional appropriations for the World Bank's International Development Association (IDA) replenishment and for voluntary contributions to UNICEF should be supported so as to maintain support of their basic education programs.

(6) Funding for basic education activities at AID should be re-instituted to at least 50 percent of education programming in the section 105 account.

PART II

SCHOOL FEEDING PROGRAMS IN DEVELOPING COUNTRIES

INTRODUCTION

The House Select Committee on Hunger recognizes the important role played by food aid programs in alleviating immediate hunger problems, as well as the contributions made to longer term economic development and to helping the chronically malnourished population to achieve food security.

The cornerstone of U.S. food aid policy is the Public Law 480, Food for Peace Program. Public Law 480 food aid programs have been politically popular in the United States because of the important markets they create for sizeable and consistent agricultural surpluses made possible by advanced technologies and improved methods of farming. The programs have been popular among governments of recipient countries because they provide resources to meet the most basic human need. And finally, Public Law 480 and the other food aid programs provide a visible sign of the U.S. Government's longstanding commitment to the alleviation of hunger and related problems.

For more than 30 years, school feeding programs, created under title II of Public Law 480, have been an important part of U.S. food assistance. School feeding programs, which provide a supplemental ration, were designed initially to provide one-third of daily food requirements. They are the only U.S. food aid efforts specifically targeted toward reducing the prevalence of hunger, malnutrition, and related health problems among school age children.

By stimulating increased enrollments, school feeding programs contribute to the advancement of literacy and other educational goals in developing countries which are essential for long-term economic development. The educational benefits and incentives are especially important for girls in view of the fact that they traditionally have had less access to education than boys in many developing countries. School feeding programs have positive impacts on achievement and cognitive development by increasing attendance, attentiveness, and activity levels, as well as by alleviating other hunger- and malnutrition-induced obstacles to learning. By providing a vehicle to teach nutrition, health, and agriculture, school feeding programs have the potential for contributing to long-term and sustained improvements in the nutritional status of the population, and therefore are an important component of a strategy to reduce malnutrition.

In spite of these actual and potential contributions to alleviating hunger and related development problems, funding for school feeding programs has been reduced drastically over the past 15 years. In fiscal year 1986, school feeding program funding amounted to

only 5.98 percent of the total Food for Peace Program (FFP) funding; in 1971, it accounted for 58 percent of the FFP budget. Furthermore, the volume of commodities shipped under Public Law 480 programs has declined from more than 18 million metric tons in the late 1960's to less than 8 million metric tons in the 1980's. [6]

Two arguments are used to justify the cutback in support for school feeding programs. First, it is claimed school feeding programs are not effective in producing nutritional impacts and other supplemental programs might be more beneficial. This claim is refuted by recent evaluations which demonstrate that school feeding programs which are well targeted and implemented do in fact have substantial nutritional impacts.

The second argument supporting school feeding cutbacks is based on the goal of phasing over responsibility for operation and support of school feeding programs to recipient countries. As a goal this approach may have merit. However, past experience warns that operationally there is danger that program phase-overs will in fact become phase-outs and as a result contribute to an increase in hunger and malnutrition and impede development.

This study will elaborate on the important benefits of school feeding programs. It also will refute the rationale for decreased funding of school feeding programs and will advocate maintaining these programs. Finally, it will review impacts of past phase-over attempts and make recommendations for ensuring that the nutritional needs of school children in developing countries continue to be addressed by U.S. food assistance policy.

SUMMARY AND RECOMMENDATIONS

Allocation decisions made by the U.S. Agency for International Development (AID) have resulted in a dramatic decrease in U.S. support for Public Law 480 school feeding programs in recent years.

The rationale for decreased support can be traced to two principal factors. First, except for disaster assistance and relief, food subsidy programs have fallen out of favor with policymakers and development agencies as a strategy for alleviating short- and long-term hunger and related development issues. Second, a reallocation of title II resources resulted from acceptance of recommendations made in an impressionistic and methodologically weak evaluation of Public Law 480 programs conducted in 1972 which concluded that " * * * school feeding does not have the potential for high nutritional and behavioral impact * * * ." [2]

More recent evaluations provide evidence which shows that properly designed and implemented school feeding programs can and do have substantial nutritional, educational, and other development-related impacts. [4,8,11] However, in many programs problems with design and implementation, as well as a lack of data, limit achievement and recognition of potential nutritional, educational, and developmental accomplishments. The following recommendations are intended to enhance the effectiveness of school feeding programs and to ensure that nutritional and other development-related needs

of school age children continue to be addressed by Public Law 480 title II programs.

(1) The United States has available supplies of food which are more than adequate for supporting high quality school feeding and other food assistance programs. Improvements in the agricultural situation in Africa have decreased the amounts of food required for emergency relief thereby freeing additional food aid resources to be used for developmental activities. Congressional intent in expanding authorities for humanitarian and developmental food assistance was demonstrated by the Food Security Act of 1985. This act expanded authority for Public Law 480 title II programs by increasing minimum tonnage levels to 1.9 million metric tons, expanded the list of eligible commodities, and established minimum tonnages for certain commodities to be distributed under section 416 of the Agricultural Act of 1949.

(2) The numbers of hungry and malnourished people in the developing world are already high and they are projected to increase over the near-term in some areas. Many of these countries lack the capacity to substantially increase their production of food and also lack the financial and other resources to import needed quantities of food. It is recommended that title II Food for Peace Programs be continued as a component of U.S. development assistance policy.

(3) In addition to producing nutritional benefits for malnourished children, school feeding programs provide an important incentive for increasing educational enrollment and improving other educational outcomes which are essential to achieving long-term development. The educational benefits and incentives are especially important for girls whose access to education and other resources, and hence their integration in development, has been constrained by intrahousehold decisionmaking which favors males over females. It is therefore recommended that school feeding programs be reestablished as a major component of the title II program.

(4) A lack of baseline and other data has seriously impeded efforts to target as well as evaluate the outcomes and impacts of school feeding programs. Current reporting and monitoring requirements should be reviewed, modified, and packaged as a management information system which will ensure that essential data for improved targeting and evaluation of educational and nutritional impacts of school feeding programs is collected by implementing organizations. The monetization mandates in the Food Security Act of 1985 provide a source of funds for evaluation and data collection activities.

- Height and weight measurements should be made prior to introduction of a program and repeated periodically throughout its operation.
- In order to even minimally assess educational impact, data on enrollment and attendance by gender should be collected for all program participants or participating schools and compared with nonparticipants, as well as with samples drawn from the nonschool population.

(5) On a more limited scale, it is recommended that evaluations to test hypothesized relationships between achievement or cognitive development and nutritional status be designed and conducted in selected field locations.

(6) Stronger efforts should be made to target school feeding programs. While targeting by individuals may be cumbersome, alternatives such as targeting by region or school, or providing variable ration sizes/payment schemes, should be explored. It is recommended that AID and school feeding program providers jointly prepare guidelines and criteria for improving targeting.

(7) Providers should be encouraged to expand upon basic school feeding program services to increase communication with parents and other community members. Cooperation from these groups is essential to program success. Therefore, the importance of refraining from substitution practices and the importance of nutritional benefits which can be gained from school feeding programs need to be stressed.

(8) School feeding program phase-overs need to be carefully planned and scheduled. Explicit criteria for determining readiness of host country governments and communities to assume primary responsibilities for program operation and funding need to be defined. AID and school feeding program providers should take precautions to ensure that phase-overs of school feeding programs will not have negative nutritional impacts. Funds made available by the monetization provisions of the Food Security Act of 1985 should be used to assist host countries to establish logistical and managerial capabilities to absorb increased responsibilities for operating school feeding programs.

(9) School feeding projects need to be integrated with other educational and nutritional programs and projects and with activities which are directed toward increasing food security, income generation, and overall economic development.

DISCUSSION

IMPACTS OF SCHOOL FEEDING PROGRAMS

The various food assistance programs operated under title II of Public Law 480 are intended to alleviate acute and chronic food security problems in lower income developing countries and to contribute to their long term economic development. School feeding programs, as one category of P.L. 480 title II, are intended to produce nutritional and educational outcomes, both of which are essential for achieving development goals.

Nutritional impacts

Public Law 480 school feeding programs are intended to provide nutritional benefits for children who are enrolled in primary schools by providing a supplementary food ration. The program was designed initially to provide a ration of 500 calories, calculated to be the equivalent of one-third of the daily requirements of school age children. The ration is intended to be a supplement to food already being consumed and therefore provides for the equivalent of a 50-percent increase in food consumption, an amount found to be sufficient to produce significant changes in nutritional status among malnourished children.

A dramatic illustration of the impact which can be made by school feeding programs is provided in a recent evaluation of program operations in Haiti, where malnutrition is known to be a seri-

ous retardant to mental development, performance and productivity in the primary school years.[4] During 1981-82, deterioration in nutritional status, reflecting widespread economic hardships, was measured among school children. However, the nutritional status of children who were participating in school feeding programs, even those at extreme nutritional risk, did not deteriorate. On average there was, in fact, some improvement in their nutritional status.

In many sites a number of factors individually or combined, including a lack of data, poor targeting, and reductions in the size of rations, have resulted in school feeding program evaluations which fail to unequivocally demonstrate nutritional impact. What is even more unfortunate are the policy decisions which apparently have been based on difficulties with evaluation and implementation, while ignoring the existence of malnutrition and nutritional needs among school age children.

Evaluation issues

Most evaluations of school feeding programs in developing countries indicate that, as a rule, few if any baseline data are collected for initial targeting of program service. Because of administrative difficulties, Public Law 480 food supplements frequently are provided to an entire school population instead of being allocated to only the nutritionally needy. And, once introduced in a school, it appears that reassessments of need are not carried out. Data on nutritional status, as well as patterns of enrollment and achievement prior to initiation of school feeding programs are rare, as are periodic assessments of changes in status of these indicators. Most programs instead concentrate on documenting effort—numbers of student meals served or tons of commodities dispersed.

Targeting and delivery issues

There are few data to document that it is the nutritionally needy who are being reached by school feeding programs. The minimal data required for targeting are based on some of the same measures which are used to assess program effectiveness in achieving nutritional impacts: height and weight records. Height for age standards serve as a relatively simple measure for distinguishing between short-term hunger and long-term nutritional status. Height to weight relationships indicate current nutritional status, and therefore potentially are useful for assessing program nutritional impact. Unfortunately, confounding factors such as substitution and ration dilution, and the fact that the food supplement is provided only while students are in school, influence the extent to which height and weight will be impacted by school feeding programs.

Income and educational indicators also might be used to target school feeding programs. Although less individualized than height and weight measurements, educational enrollment and income data tend to be more readily available. Strong correlations exist between low income and malnutrition, as well as between low educational enrollments and malnutrition. Therefore, targeting school feeding programs toward populations and/or regions having these

characteristics would be likely to capture school aged populations which are malnourished.

In addition to targeting problems, requirements for participating in school feeding programs may work against inclusion of those who are most in need. Local participation requirements are important for sharing the responsibilities for financing and operating such programs and facilitating eventual phase-overs, but the ability to provide in-kind and other resources should be secondary to need in identifying schools and individuals who are eligible for school feeding programs. A lack of time and/or other resources on the part of the neediest families and communities may mean that they are unable to meet the participation requirement and therefore be excluded from school feeding programs.

In many cases, both the targeting criteria and the ration standard which were integral to the initial program rationale have been eroded in actual practice. Changes in nutritional status indicators are affected by the size of the food ration provided and the extent to which the ration is a supplement to the diet or a substitute for food which otherwise would be provided by the family. In general, programs which offer a small ration (200-300 calories) to a large number of people are unlikely to show a measurable impact on growth.[10] Reductions in the size of rations, as well as a lack of targeting, result in provision of food supplements which in many cases are substantially less than one-third of daily nutritional requirements. Nutritional impact also is affected adversely by substitution practices such as decreasing food allocations within the household for members who receive school feeding supplements.

Impact issues and policy responses

The cumulative effect of these practices is a reduction in resources being provided to the nutritionally needy and as a consequence, a serious erosion of the potential impact which can be made by school feeding programs. But, perhaps of even greater significance are the negative attitudes toward school feeding programs which have been created among many policymakers. Instead of requiring improved targeting, assessment, and implementation to enhance the effectiveness of school feeding programs, the response has been to condemn the strategy as not being cost-effective and to decrease the resources made available to these programs.

For example, an Agency for International Development (AID) evaluation of school feeding programs in the Philippines found that 75 percent of participants were not in nutritional need. As a consequence, the program on average had only marginal impact on the nutritional status of participants and it was concluded that it was less cost-effective than other food assistance programs. But school feeding programs are the only U.S. food assistance programs which are targeted toward school age children and there are substantial numbers of malnourished and nutritionally needy school age children in the Philippines. Therefore, the recommendation to downgrade the priority of school feeding programs in the Philippines and phase over the responsibility for funding and operating the program to the local government should have been made only if there was some evidence that government-operated programs were more effective in reaching nutritionally needy school age children.

In fact, school feeding programs operated by the government also were found to be poorly targeted.[1] Neither set of programs was effectively reaching those in nutritional need.

A negative evaluation of school feeding programs in the Dominican Republic, a country in which 75 percent of the population was estimated to be undernourished during a period of economic hardship in 1983, resulted not only in withdrawal of U.S. assistance, but complete termination of school feeding programs. In this case, the evaluation findings indicated that in addition to being poorly targeted and accorded very low priority by the AID mission, many of the individual programs had been plagued by numerous management and implementation problems. Only small nutritional impact was documented. However, analysis of the experience in the Dominican Republic following termination of the program documented that school feeding had a strong positive educational impact in the form of increased enrollment.

In view of the longstanding commitment of the U.S. Government to alleviating hunger problems in food deficit nations, a policy response more appropriate than abruptly and prematurely phasing out programs would be to take measures to improve targeting and management. Such a response would make a greater impact on the nutritionally needy and would permit continuation of politically popular, institutionalized programs in a more cost-effective manner.

Although it is acknowledged that targeting almost always makes programs most cost-effective, political unpopularity and the lack of targeting infrastructure have been major impediments to more widespread use.[10] Some political concerns are derived from experience with domestic targeted programs and are based on the fear that selection of individuals to receive or be denied supplemental food rations might result in stigmas for recipients. However, there is little or no evidence which confirms that such stigmas or negative labelings do in fact occur in developing countries. Greater political concerns can be traced to fears that governments and/or private voluntary organizations (PVO's) in charge of implementation may be pressured to make food rations available to all students in a given area if those who are excluded from the school feeding program are visible and vocal.

A number of strategies have been followed by some agencies which offer hope for avoiding or minimizing politically negative responses which result from excluding some individuals/groups and including others. Geographical targeting has been found to minimize negative responses. With geographical targeting, services are provided to all members of a given age group in an area or region characterized by low levels of income, large numbers or percentages of school age children who are malnourished or cognitively impaired, or low educational participation rates. Another strategy which has been suggested to improve program effectiveness while minimizing negative political repercussions is to provide a minimum supplement to all students but target larger rations to the more nutritionally needy. Similarly, in program settings where some charge is made for the food supplement, the amount charged might be varied in relation to evidence of nutritional or other food.

Improved targeting will require additional administrative input and resources. However, since it requires relatively simple screening and decisionmaking procedures, targeting is not likely to increase total program cost significantly. In fact, savings in total program resources and costs might result.

Finally, examples of successful targeting exists. In India, CARE has successfully targeted school feeding assistance by district and in some cases has been able to target the poorest and most nutritionally needy students within schools. The result has been higher levels of impact than achieved by other programs being operated in similar environments.[8]

Educational impacts

Most assessments of educational impacts of school feeding programs have focused on their direct short-term impacts on school age children: increased enrollments, improved attendance, and to a lesser extent, improved cognitive or achievement-related performance, and decreased attrition and wastage. But many of these assessments have been handicapped by a lack of baseline and other data. Reliable assessments of longer term educational impacts on school age children, their families and communities are even more rare.

Short-term impacts

In developing countries, children traditionally are expected to contribute to the support of the household by their involvement in petty trading, food production, grazing livestock, carrying water, and other tasks. The work of girls within the household is especially valued. As a result, educational participation has a cost to families which goes beyond direct outlays for uniforms, fees, and books. School feeding programs have been shown to be an effective vehicle for overcoming the reluctance of families to send their children to school.

Tamil Nadu, India experienced a 70-percent increase in school enrollments in the six months following introduction of free meals.[10] The Dominican Republic, on the other hand, saw school attendance drop nearly 25 percent when school feeding was discontinued.[11] School feeding programs have been found to have substantial impacts on enrollment and attendance rates in areas characterized by low incomes and low educational participation. In the absence of incentives, parents are significantly more likely to send their sons rather than their daughters to school. They are also more likely to send their older children rather than their younger children to school.[8, 12, 13, 14]

School feeding programs have greater enrollment and attendance effects for girls than for boys, and for rural populations as compared with urban populations. An analysis of changes in enrollment rates in rural school districts in India between 1973 and 1978 found consistently higher enrollment rates for girls in districts which had school feeding programs than in the districts which did not have these programs. In eight districts in which school feeding programs were introduced between 1973 and 1978, total educational enrollment increased by 24 percent and educational enrollment of girls increased by 39 percent.[8]

Although it is hypothesized that school feeding programs improve cognitive development in school children, it has been difficult to firmly establish a causal relationship. Current diet has been identified as the single most significant predictor of classroom achievement.[17] Other studies have shown that by alleviating short-term hunger, supplementation increases children's energy levels and improves their attentiveness. Consequently, these children are likely to learn more readily than they would otherwise. Timing of delivery of the food ration may be important in determining the extent to which this effect occurs. If more teaching occurs during the morning hours of school, provision of the ration at noon or later could be expected to have less of an impact on attentiveness than if it is provided earlier in the day. However, attendance in the afternoon may suffer if the ration is provided earlier in the day.

Longer-term impacts

It is important to recognize the important contribution made by school feeding programs to long-term development and improved equity through their impacts on educational enrollment and attendance. By offsetting familial inequalities and increasing educational benefits for subgroups which traditionally have lagged behind other groups, intergenerational impacts of increased literacy on future earnings, fertility and mortality rates, and other aspects of social and economic developments are set in motion.

Additional longer-term impacts on hunger related issues and economic development can be contributed by programs which integrate school feeding with nutrition education or education for children and families on food production, processing, and preservation. School feeding has a distinct cost and other advantages over other food assistance programs in this regard because it is implemented within an established educational infrastructure.

The feasibility of operationalizing these procedures is illustrated by school feeding programs which have been implemented in Lesotho, Peru, and the Philippines. In these countries, a variety of health, nutrition, and other educational materials are integrated with the school feeding program. In the Philippines, students are taught how to measure and monitor weight and height, and the relationship among these indicators, diet and nutritional status.

In the Gambia, home economics teachers are responsible for the day-to-day management of the school feeding program. Each year they participate in an in-service training program for 2 weeks during which the school meal and related curricular materials are discussed. This represents a cost-effective approach to providing teacher training for expanded school feeding programs.

In most locations, parents are required to participate in school feeding programs by providing donations of additional food, labor, fuel, and other materials. Therefore, there is an established avenue of communication with parents which can be expanded and strengthened to provide information and instruction on concepts of food preservation/protection, health, nutrition, and hygiene, which are likely to contribute to long-term development goals.

Local participation by parents, schools, and communities also provides a focus for capacity building and development and refin-

ing organizational and management skills which are primary objectives of integrated rural development and other projects. Closer involvement of parents and other members of the community with school feeding program activities can have significant impacts on child survival.[9] Parents who are familiar with the benefits of school feeding programs have been found to be more likely to send their children to school than those who are unaware of them.[11] Education and outreach for parents also can prove to be effective in reducing substitution and sharing of rations.

It is clear that school feeding programs can have positive educational impacts for school age children. There is potential for even greater impact on families and communities if more programs use school feeding as both an incentive and a catalyst for encouraging self-help and other activities which are essential for economic and social development.

PROGRAM PHASE-OVERS

Public Law 480 school feeding programs in developing countries are intended to provide long term but temporary food assistance to nutritionally needy school-age children. Local financial, in-kind, and administrative participation by governments and beneficiaries is required, in part, to facilitate institution building and a smooth phasing over of funding and operating responsibility to host governments which is an ultimate goal of the program. Such participation typically includes providing internal transportation, training programs, personnel and equipment, as well as providing locally grown commodities to be combined with Public Law 480 commodities in the food ration or supplement. However, there is little evidence that this participation transfers to the successful phasing over of responsibilities for funding and operating school feeding programs.

Many attempted phase-overs have actually resulted in phase outs. The school feeding program in the Dominican Republic is a case in point. An abrupt termination of U.S. support for the programs in this country in 1978 and a lack of locally produced commodities or alternative sources of supply resulted in termination of school feeding and decreased food for 214,000 children. Data collected from the disenfranchised population indicate that significant deterioration in health and nutritional status resulted.[11]

At the present time there is a massive cutback in Public Law 480 resources being made available to school feeding programs in India. The rationale for this decrease appears to be linked with the fact that India recently has become an exporter of some foodgrains. It is not based on the nutritional status of the population. The fact that the supply of wheat and some other foodgrains is sufficient to permit exports does not, of course, indicate that the nutritional needs of the Indian population have been completely satisfied. Marketed foods have a price, and the basic fact is that a large segment of the population lacks the income to purchase food that is adequate for meeting their nutritional needs. Furthermore, the Government of India lacks the resources to absorb all the costs of operating school feeding programs and continue to fund its other development efforts.[15]

The Food and Agriculture Organization [FAO] estimates that there are 200 million malnourished people in India. Thus, there is a clear need for continuation of food assistance programs in India. That the majority of the 200 million malnourished are children means that there is a need for programs to be targeted toward this group. Yet, if carried out as scheduled, by 1989 the entire school feeding program operated by CARE in India, which provided a mid-day meal to 6.9 million children, most of them residing in rural areas, will be terminated. To the extent that domestic resources can make up the difference lost from title II support, it can be expected that some of the dropped children will continue to receive nutritional supplements. However, it is clear that the Government of India does not have sufficient resources to rapidly take over the operation of school feeding programs which had been made possible by donations of Public Law 480 commodities. Therefore, as a result of program termination, it can be expected that the nutritional status of sizeable numbers of school children will deteriorate. Furthermore, the elimination of the attendance incentive effect of school feeding is likely to result in decreased school attendance and further erosion of educational and other development goals. And other development efforts funded by the Government of India may have to be terminated.

There is very real danger that premature and/or one-sided decisions to phase over school feeding programs will result in a worsening of hunger and malnutrition in many countries of the developing world. The criteria used to determine readiness for phase-over are unclear. In fact, a U.S. Department of Agriculture official recently stated that there currently are no formal criteria to determine when food aid will be terminated nor has there been systematic study of the procedures or issues involved in the process of phasing over.[5] What is clear is that there has been a dramatic decrease in resources made available to school feeding programs by the United States in the last 15 years.

Abrupt phase-overs/phase-outs and the negative consequences they incur should be avoided. Careful assessments should be made of recipient countries' commitments to nutrition programs and their potential for successfully taking over support and management of school feeding programs. The PVO's, which traditionally have operated programs, as well as host government staff and individuals in local communities, should be involved in making these assessments. Because of the important food production and processing roles performed by women in many developing countries, as well as the preponderance of female headed households, women should be included in planning strategy and procedures for phase-overs.

At a minimum, consideration should be given to the following:

- (1) The time frame, sequencing and schedule during which the phase-over will occur.
- (2) The extent to which additional technical and planning assistance might be required to ensure smooth phase-overs.
- (3) The adequacy of existing program infrastructure for meeting current and anticipated needs.
- (4) Assurance that the recipient government has access to sufficient food and other resources to avoid harmful cutbacks

in levels of operation of school feeding programs and/or cutbacks or termination of other development efforts.

(5) Procedures to be followed for renewal of aid in emergency situations.

(6) The costs of foregone impacts resulting from termination should be weighed against the real costs of continuing programs support.

To facilitate phase-overs, school feeding projects need to be integrated with other programs and projects which are directed toward increasing food productivity, income generation, and overall economic development. The process of phase-overs should be designed to increase local level and community participation.

CONCLUSION

The United States is engaged in numerous long-term assistance efforts which are intended to enable developing countries to achieve food security and other economic and social development goals. Yet in the near term many developing countries will be unable to achieve self-sufficiency in good production or to provide basic food security for large percentages of their populations. Therefore, there is a continuing need for intervention strategies to directly attack hunger and related development problems.

In pursuit of its long-term goal of helping the poor to achieve food security, the Select Committee on Hunger has had an ongoing interest in working to improve the effectiveness of Public Law 480 food assistance programs. As a result of AID's decision to decrease resources for school feeding programs under title II of Public Law 480, there has been a severe curtailment of efforts to meet the nutritional needs of school age children in food deficit countries.

The Select Committee on Hunger is strongly convinced of the merit of providing food assistance targeted toward this age group and that school feeding programs are an effective vehicle for so doing. School feeding programs offer two methods for eradicating hunger. As supplementation programs, they alleviate children's short-term hunger and improve their nutritional status. By providing an incentive for children to come to school and providing an environment in which children learn about good health, nutrition, and agricultural practices, school feeding programs increase educational participation of disadvantaged groups and can provide communities with the skills that will promote their good health and nutritional status into the long term.

A number of actions and procedures should be undertaken to ensure that school feeding programs achieve their nutritional, educational, and developmental potentials. One of the major factors which has made school feeding vulnerable to cutbacks and phase-outs is a lack of reliable data useful for demonstrating program impact. Data collection requirements should be reviewed and revised to enable implementers and policymakers to improve targeting of school feeding programs, as well as to assess the extent to which intended nutritional, educational, and other impacts are being achieved.

Targeting is cost-effective, but frequently is cumbersome to implement. Alternative approaches need to be followed to improve

targeting of school feeding programs, taking into account factors such as existing infrastructure and extent of malnutrition in the school age population. Guidelines for improving targeting should be prepared jointly by AID, PVO's, and local parties involved with implementing school feeding programs.

Premature phase-overs of school feeding programs should be avoided. There is a clear need for development of explicit criteria for determining the basis on which programs will be phased over, as well as the stages and sequences of activities which will be followed to phase over responsibility for funding and operation. These criteria should include consideration of nutritional status of the population and the resources available to the host country or region for assuming various types of responsibilities, for example, administration, financial support, provision of food. All parties involved in designing and implementing school feeding programs should participate in the formulation of these criteria and guidelines.

SCHOOL FEEDING IN HAITI

One of the most serious problems in Haiti is the pervasiveness of malnutrition. The magnitude of the problem was documented by the National Survey of 1978. The survey found that almost 16 percent of preschool age children (under 5 years) suffer from acute malnutrition (wasting), while roughly 27 percent have chronic malnutrition (stunting). However, problems of malnutrition are not limited to preschool age children. Malnutrition is also a serious problem with the primary school population. It retards mental development, performance, and productivity, and has implications for the level of functioning in the adult years. The Haitian School Feeding Program is an effort to reduce the prevalence of malnutrition.

The Haitian School Feeding Program was instituted in 1958 as part of the Public Law 480 title II programs. Now in its 29th year, the Haitian title II program includes: school feeding, food for work, maternal-child health, preschool feeding, and other child-feeding and general relief. Twenty percent of the Haitian population—over 1 million people—currently receive some form of assistance from title II programs.

The largest title II program in Haiti is the school feeding program which accounts for 70 percent of program beneficiaries and more than half of the commodities (both in tonnage and dollar value). The school feeding program reaches 70 percent of public schools and 35 percent of private schools. Since its inception in 1958, the Haitian School Feeding Program has grown enormously. Between 1974 and 1981 the number of recipients more than doubled and the value of commodities rose by more than \$4 million. In fiscal year 1985, over 30,339,000 metric tons of commodities were sent to Haiti under title II programs; the dollar value of the food-stuffs totaled approximately \$7,910,000. This provides food rations for more than 444,000 children. The commodities most widely distributed in Haiti are soy-fortified bulgar and corn meal. Corn-soy milk, nonfat dry milk, soy-fortified flour, and wheat soy blend are also distributed in the Haitian School Feeding Program. A typical

meal for a Haitian child includes bulgar or corn meal porridge mixed with oil and a glass of milk.

Five voluntary agencies distribute food and provide related services to the participating Haitian schools: CARE, Catholic Relief Services [CRS], Church World Service [CWS], Seventh Day Adventist World Service [SAWS], and World Food Program [WFP]. The majority of the school feeding activity is carried out by CARE. In fiscal year 1981, CARE provided approximately one-half of the commodities to the schools, which fed 54 percent of the students.

The Haitian School Feeding Program has two main objectives. First, the program aims to provide supplemental food with high nutrients to improve the status of malnourished and undernourished people in Haiti. Second, it hopes to contribute to solutions of development problems relating to health and nutrition by stimulating and supporting host government development activities. The program has had positive impact on the nutritional well-being of its participants. A study conducted in 1982 found second year program children had a higher nutritional status than nonstudents while children who did not receive school feeding rations were worse off and they declined nutritionally over time. The program demonstrates a "safety net" effect in the face of harsh environmental conditions and deteriorating material welfare for families in Haiti.

However, there are some steps which would further strengthen the Haitian School Feeding Program. The Haitian government could take a more active role in program design, coordination, and implementation. Integrating the school feeding program into its overall development strategy would result in a more effective program which responds directly to the needs of the Haitian people. Similarly, with an increased government role, Haitian officials could design their own monitoring system and supervise the use of school feeding commodities. Such action would increase the effectiveness of the Haitian School Feeding Program.

Despite some management problems, the Haitian School Feeding Program helps to meet vital nutritional needs. The program reaches 70 percent of the malnourished target group providing an average ration which is equal to one-third of the required daily allowance in calories. There is a definite causal relationship between the school feeding program and nutritional well-being. The presence of a school feeding program strongly affects enrollment, attendance, and drop-out rates of participants. While the nutrition education component of the program could be upgraded, school feeding participation becomes the most important predictor of change in children's nutritional status.

SCHOOL FEEDING PROGRAM BY VOLUNTEER AGENCY [VOLAG] FISCAL YEAR 1981

VOLAG	Total participating schools		Total recipients		Total commodity amount		Dollars	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
CARE.....	677	49	193	54	7,916	56	2,895	57
CRS.....	326	24	91	25	3,462	25	1,236	24
CWS.....	240	18	48	13	1,620	11	586	12
SAWS.....	125	9	27	8	1,112	8	379	7
Total.....	1,368	100	359	100	14,110	100	5,096	100

Source: PVD/USAID/Haiti.

RECIPIENTS OF TITLE II AND SCHOOL FEEDING ASSISTANCE IN HAITI (SELECTED YEARS)

	Fiscal year—			
	1979	1981	1984	1985
Total title II recipients.....	433,300	867,800	655,300	668,500
School feeding recipients.....	253,000	359,000	442,600	444,000
ADRA				(52,000)
CARE	(140,000)	(193,000)	(227,000)	(227,000)
CRS	(52,000)	(91,100)	(100,000)	(100,000)
CWS	(44,000)	(48,000)	(65,000)	(65,000)
SAWS	(17,000)	(27,000)	(50,000)	

Source: USDA

SCHOOL FEEDING IN INDIA

The school feeding program in India, known locally as the one-mid day meal program, is one of the oldest and largest in the history of Public Law 480 school feeding programs. Over the past 25 years, almost one-half of the food donated or sold on concessional terms by the United States under Public Law 480 has been received by India for school feeding and other food programs. School feeding began in India for poor school age children in the city of Madras in 1925. U.S. food donations for school feeding did not begin until 1951 when the India Food Aid Act was enacted. Increases in donations followed enactment of Public Law 480 in 1954 and the passage of the Food for Peace Act in 1966. In 1978, of the 71.3 million children enrolled in the first five grades of primary school, about 9.5 million or 13 percent received title II commodity support in the school feeding program.

The typical mid-day meal provided through this program consists of a small bowl of bulgur wheat cooked with oil and mixed with vegetables and spices available in the local diet. The portion of bulgur provides one-quarter of a child's daily protein requirements and one-fifth of its daily caloric needs.

Although substantial assistance has been received from the United States and other donors, support for school feeding activities by the Government of India continues to be a major national effort. In its Sixth Five Year Plan, the Government of India places high priority on achieving universal elementary education and recognizes that special incentives such as school feeding must be offered to motivate rural families to enroll their children in school. These incentives have been found to be especially beneficial for residents of rural areas, girls, tribal minorities, and others who might be precluded from receiving an education because of the caste system, social prejudice, or lack of family resources.

Most title II and other school feeding donations in India and elsewhere are administered by U.S. nonprofit private voluntary organizations (PVO's). These agencies are able to combine food distribution activities with development and nutritional goals and frequently contribute their own resources to enhance the services and coverage of the programs. For example, Catholic Relief Services [CRS], which is one of two organizations currently administering food aid programs in India, estimates that it commits more than \$800,000 of its own resources each year for administration, direct support, and support of projects related to the food programs operated at 2,500 feeding centers throughout the country. In addition, a

network of 150 local counterpart organizations contribute both financial resources and coordination and elicit grassroots support from more than 1.3 million recipients of CRS-administered food aid programs.

CRS targets its school feeding program toward children in private schools in urban slums and rural areas who are not covered by government programs. It emphasizes the attendance incentives and enhancement of learning retention outcomes of school feeding programs. In fiscal year 1981, 485,000 school children received food assistance through school feeding programs administered by CRS. Owing to shifting priorities within the title II program and pressures to phase over school feeding programs in India, the CRS program decreased to 197,000 recipients in 1984-85. In the absence of a change in administration policy, it is expected to be discontinued completely by 1988.

The largest Public Law 480 school feeding program in India is administered by CARE. Since 1950, of the food assistance provided abroad by CARE from title II resources, 32 percent has gone to India. CARE focuses on children in rural areas of 12 states. In fiscal year 1981, CARE served 9 million children in rural schools. Children from scheduled castes and scheduled tribes, who traditionally have limited access to educational and other services, are serviced on a priority basis. By fiscal year 1986, the size of CARE's school feeding program had decreased to about 5.3 million children. Title II budget pressures linked with the apparent policy of the administration to attach low priority to school lunch programs and programs in Asia forced CARE to drop about 2.8 million school children in the preceding 2 years. By October 1988, CARE expects that it will have to discontinue its school nutrition programs in six states, thereby dropping another 2.8 million children from the rosters. The remaining 1.3 million children are scheduled to be dropped by 1989.

What will happen to the children who are dropped from the CARE and CRS programs? It is expected that in some cases the state governments will be able to absorb the costs and other lost resources. In Tamil Nadu state, the school feeding program which provides mid-day meals for 6 million children had been financed by the state since 1982. The cost of the program has increased from \$100 million per year in 1982 to \$200 million in 1986. Similarly, Gujarat and Maharashtra states have completely taken over operation of their school feeding programs. But, if disenfranchisement is to be avoided given the forced phase outs which are in progress, in Karnataka state, where 700,000 or one-half of all school feeding beneficiaries received title II food through CARE, the state will have to double its support of the program within 2 years (increasing from \$5 million per year to \$10 million per year). The value of local commodities and administrative costs contributed by the states and municipalities in India exceeds 50 percent of the value of the program, but it is unlikely that their budgets will increase quickly enough in the short-run to offset the rapid phase out of title II support.

There seems to be little doubt that the precipitous withdrawal of U.S. support for school feeding in India will have negative nutritional and educational impacts. State government efforts to achieve

universal elementary education (discouraging early and disproportionately high dropout rates among young girls) and to improve the quality of primary education for economically deprived school age children in rural areas which are important for achieving long-run development goals will be impeded. It is quite likely that when the food for the noon meal is no longer provided, many of the children will stay home from school. Those who continue to attend will eat little or nothing. These children are more likely to be inattentive or disruptive as a result of hunger. The children who stay at home will do household tasks considered by the parents to have more utility to the family than a day at school without the incentive of a meal being provided.

RECIPIENTS OF TITLE II AND SCHOOL FEEDING ASSISTANCE IN INDIA (SELECTED YEARS)

	Fiscal year—			
	1979	1981	1984	1985
Total title II recipients.....	29,295,239	25,131,000	14,254,000	13,611,300
School feeding recipients.....	9,434,000	9,485,000	6,685,000	6,055,000
CARE.....	(9,000,000)	(9,000,000)	(6,488,000)	(5,858,000)
CRS.....	(434,000)	(485,000)	(197,000)	(197,000)

Source: USDA.

REFERENCES

- [1] Blumenfeld, S., M. Flores, M. Mack, M. Norton and R. Pooley, *P.L. 480 title II: A Study of the Impact of a Food Assistance Program in the Philippines*, AID Program Evaluation Report No. 6, Washington, D.C., 1982.
- [2] Checchi and Co., *Food for Peace. An Evaluation of P.L. 480 Title II*, Checchi and Co., Washington, D.C., 1972.
- [3] Community Systems Foundation, *An Evaluation of the P.L. 480 Title II Program in India*, Ann Arbor, Mich. 1970.
- [4] Cotten, J., M. Rycus, R. Timmons, and W. Drake, *Evaluation Research on the P.L. 480 Title II School Feeding Program in Haiti*, U.S. AID, Port-au-Prince, Haiti, 1985.
- [5] Crowley, P.R., "Phaseover of Food Aid Programs," in M.J. Forman, ed., *Nutritional Aspects of Project Food Aid*, United Nations, Rome, Italy, 1986.
- [6] Epstein, S., *U.S. Bilateral and Multilateral Food Assistance Programs*, Congressional Research Service, Washington, D.C., 1985.
- [7] Forman, M.J., ed., *Nutritional Aspects of Project Food Aid*, United Nations, Rome, Italy, 1986.
- [8] Gupta, M.C. and K. Hom, *Evaluation of P.L. 480 Title II School Feeding Program in India*, U.S. AID, 1984.
- [9] Guruge, A.W.P., "School Feeding Programmes as a Potential Source of Learning," Tamil Nadu, India, unpublished paper, 1983.
- [10] Kennedy, E.T. and H.H. Alderman, *Comparative Analyses of Nutritional Effectiveness of Selected Interventions*, International Food Policy Research Institute, Washington, D.C., 1985.
- [11] Levinger, B., *School Feeding Programs in Developing Countries: An Analysis of Actual and Potential Impact*, U.S. AID Special Study #30, Washington, D.C., 1986.
- [12] Mook, P. and J. Leslie, "Childhood Malnutrition and Schooling in the Terai Region of Nepal," Report No. EDT 17, World Bank, Washington, D.C., 1985.
- [13] Pollitt, E., "Nutrition and Educational Achievement," Nutrition and Education Series, Issue #9, UNESCO, 1984.
- [14] Rao, A.P., "The Impact of School Incentives on the Enrollment, Attendance and Retention of Girls at the Primary Level: A Case Study of Ambakach Primary School, Limkheda Taluka, Gujarat," Indian Institute of Management, Ahmedabad, India, unpublished paper, 1985.

- [15] Swaminathan, M.C., "Phaseover of Programs," in M.J. Forman, ed., *Nutritional Aspects of Project Food Aid*, United Nations, Rome, Italy, 1986.
- [16] U.S. AID, "P.L. 480, Title II Program. Three Private Voluntary Organizations," Audit Report No. 1-517-83-11. Washington, D.C., 1983.
- [17] Wilson, A., "Longitudinal Analysis of Diet, Physical Growth, Verbal Development and School Performance," *Malnourished Children of the Rural Poor*, Auburn House, Boston, Mass., 1983.

